



WORKING PAPERS IN LINGUISTICS

No. 5

TWANA PHONOLOGY

by

Gaberell Drachman

DEPARTMENT OF LINGUISTICS
THE OHIO STATE UNIVERSITY
DIETER CONZ HALL OF LANGUAGES
1841 FULLINWIDE ROAD
COLUMBUS, OHIO 43210

June, 1969

Department of Linguistics
The Ohio State University
Columbus, Ohio 43210

Department of Linguistics
The Ohio State University
Columbus, Ohio

WORKING PAPERS IN LINGUISTICS

NO.5 : June, 1969

Twana Phonology
by Gaberell Drachman

FOREWORD

This publication was submitted as a doctoral dissertation to the Department of Linguistics at the University of Chicago, March 1969. The original dissertation, to which the present publication is identical except for pp. i-viii, is available in microfilm. This publication was made possible by a generous grant from the Board of Directors of The Ohio State University Development Fund.

DEDICATION

This thesis is dedicated to four people: to my late father and mother, Isadore and Elizabeth (née Zamick) Drachman, to whom I owe by nature and nurture whatever talents I have; to my wife Angeliki (née Malikouti), who urged and sustained me, both throughout my studies and to the completion of this work; and to "Grandma" Louise Pulsifer, oldest living member of the Skokomish tribe, whose patience in infirmity made it possible for me to glean some understanding of the workings of the Twana language.

ACKNOWLEDGEMENTS

The field-work on which this thesis rests was supported by the Survey of Northwest Languages sponsored by the National Science Foundation and administered by the University of Washington at

Seattle, Washington.¹ Professor Lawrence C. Thompson, Director of the Survey over the three summers during which I was in the field, gave me much kind support and encouragement, as well as the benefit of his considerable experience with the languages of the area.

Deeper in its own way is my debt to Professor Eric P. Hamp, of the University of Chicago. It was very largely due to his influence that, at the hoary age of thirty-seven, I set out to make linguistics my career rather than my hobby. Yet more concretely, it was due to his efforts that I was awarded NDEA Fellowships enabling me to complete four years of study at the University of Chicago. Having advised and befriended me in all my studies, he also in the end guided me to the completion of this thesis, even from abroad.

To Professor James D. McCawley I owe my initiation into the motivations and mechanisms of generative grammar, through the gift of many patient hours of argument and explication.

Last, but by no means least, I owe to Professor George V. Bobrinskoy the gift of his friendship and wise encouragement throughout my career at the University of Chicago, in matters both academic and personal.

¹The Survey has now moved its base to the University of Hawaii.

TABLE OF CONTENTS

	Page
FOREWORD	ii
LIST OF ILLUSTRATIONS	ix
Chapter	
I. INTRODUCTION	
1. Scope and Intention	1
2. Background	
1. Location, Population, Culture-Area, and Chronology	3
2. Linguistic Affiliations and Areal Features	6
3. Contact Languages	8
1. Clallam	9
2. Puget Sound	9
3. Satsop and Lower Chehalis	11
4. The Chinook Jargon	12
4. Previous Study of Twana	13
5. Field Situation and Informants	15
6. Character of the Main Corpus	17
1. The Word Lists	17
2. The Texts	19
3. The Phonological Component	
1. General	20
2. The Data To Be Utilized	23
3. The Segment Inventory	
1. Swadesh's Inventory	25
2. Elmendorf's Inventory	26
3. The Inventory of this Thesis	27
II. THE AUGMENT	
1. The Morpheme Strings Involved	30
2. Taxonomy	
1. Plural Types	33
2. Augment Types	36
3. Monosyllabic Stems	
1. Voiceless Obstruent Stems	38
2. Voiced obstruent and N stems	39
3. l,w,y Stems	41
4. Disyllabic Stems, Oxytone	47
5. Trisyllabic Stems, Paroxytone	50
6. Rule Summary I	53

II. THE AUGMENT--cont.

7. Augment Clusters	
1. General	53
2. Clusters with Velar as C ₂	56
3. Clusters with Voiced Consonant as C ₁	58
4. Clusters with Y Plus Voiceless Consonant	58
5. Clusters with Velar Spirant plus Oral Consonant	60
6. Residual Forms, and s- Assimilation	63
8. Representation of b,d	63
9. Glottal Absorption	67
10. Rule Summary 2	71
11. Summary of Stress and Vowel-Loss Phenomena	72
12. Glottal Stop in Unaugmented Stems	
1. Clear cases	74
2. Probable cases	77
3. A Select Twana Herbarium	78
13. Stem-internal Glottal Stop, and Glottal Absorption	81
14. Twana Number Systems	83
15. Twana Laryngeals	
1. Introduction	85
2. Affix Truncation	86
3. Laryngeal Affection	
1. By h	90
2. By ?	93
4. h-Mutation	94
5. Vowel Assimilation	96
6. Stress-Shift to Affix	98
7. C+h Metathesis	98
8. The Derivation of 'one by one'	100
9. h and the Unvoicing of l	101
16. Rule Summary 3	105
17. Laryngeal Stems	106
1. Introduction	107
2. Laryngeal-initial	108
3. Laryngeal-final	110
18. Specification of h/? , w/y	
1. General	112
2. w/y and the Semi-Vowel Rule	113
19. d-Loss, n-Loss	115
20. Shwa-insertion	
1. General	117
2. With n-loss	120
3. Syllabic Offglide with ɿ	122
4. Shwa Insertion with Nominal and Stative	123
5. Ordering of Shwa-insertion	123
21. Irregular Stress	
1. General	125
2. Stress Allomorphy	127
3. 'Not Retraction Rule'	128
4. Secondary Shift	129
5. Stressed Reduplication	130
22. Rule Summary 4	130

III. THE ATTENUATIVE

1. Introductory	
1. Survey of Vowel Contrasts	132
2. Survey of V ₁ V ₁ Sequences	134
2. Types of Attenuative	137
3. Constituent Structure and Rules	
1. 'Length' vs. Constituent 'Vh'	138
2. VV Merger	142
3. Glottal-Insertion, and Ordering	143
4. Options	145
5. Rule Summary 5	148
6. Laryngeal Stems	
1. Laryngeal-Initial	
1. General	149
2. Alternative Attenuative Structure	153
3. The V ~ a Rule	154
4. Summary	154
2. Laryngeal-final	
1. General	155
2. Re-appraisal of Stress-Assignment	157
3. Analogical Stress-Shift	158
4. Re-appraisal of VV Merger	158
5. Loss of Prefix Vowel	159
6. Rules Illustrated by the Corpus	160
7. Contradictions in Apparently Laryngeal- Final Stems	161
8. 'Non-Vh' Attenuative	162
9. Summary	164
7. Infix Attenuative	
1. 'aɪ' and Obligatory Infix	
1. General	164
2. Problem Forms	168
2. Simple Infix	170
3. Summary	174
8. Rule Summary 6	174

IV. THE PHONETIC OUTPUT

1. Introduction	
1. General Note	176
2. Consonant Contrasts (Surface)	178
3. Vowel Contrasts (Surface)	180
2. Major Class Features	
1. Sonorant, with a Caveat	181
2. Consonant	181
3. Syllabic, and the Semi-Vowel Rule	181
4. Twana Distribution of Major Class Features	182
3. Cavity Features	
1. Anterior and the Need for Oral	182
2. Coronal	182

IV. THE PHONETIC OUTPUT--cont.

3.	High, Low, and Back	
1.	Support for 'mid-front' as the Speech-Neutral Vowel--a Formal and Substantive Universal	183
2.	Tongue-body Features and Twana Vowels	185
4.	Coronal and High. The Misleadingness of Old Diffuse	186
5.	'k -č- ċ' and the 'Alternation Condition'	186
6.	Rounding	195
7.	Secondary Aperture	
1.	Nasals, Loans, and the Nasal Sound-Shift	
1.	General	197
2.	Physiological Considerations	201
3.	Allophones of N, Allophones of B	203
2.	Laterals	205
8.	Other Voice Obstruents	
1.	General	205
2.	The Trend to Obstruence	208
9.	Glottal Constriction	
1.	Degrees of Glottal Constriction	209
2.	l̥, w, y : but b, d	210
10.	Twana Distribution of Cavity Features	211
4.	Manner Features	211
1.	Continuant	212
2.	Instantaneous Release and Twana Affricates	213
3.	Supplementary Movements: Oral Pressure and Twana Glottalization	215
4.	Tense-Lax	
1.	Introduction	216
2.	In Vowels	
1.	Gross Considerations	217
2.	Co-articulation	218
3.	Length	231
4.	Rule Correlation	232
3.	In Consonants	
1.	General	234
2.	The Behavior of h/?	234
5.	Twana Distribution of Manner Features	237
5.	Source Features	
1.	Heightened Sub-glottal Pressure	237
2.	Voice	238
3.	Stridency	238
6.	Conclusions	
1.	The Distinctive Features of the Twana Consonants	240

Appendices

I. TWANA TEXT

1.	A Note on the Transcriptions	241
2.	A Note on the Tale	242

I.	TWANA TEXT-- <u>cont.</u>	
3.	Text and Interlinear Translation	243
4.	Literary Translation	248
5.	Commentary	
1.	Notes on the Text	249
2.	Grammatical Morphemes	266
II.	THE SHAPES OF LEXICAL MORPHEMES	
1.	A Note on the Shapes of Morphemes in Twana	270
2.	Morpheme Lists	272
III.	SOURCES CITED	
1.	List of Abbreviations	281
2.	Sources Cited	281

LIST OF ILLUSTRATIONS

Figure	Page
1. Twana Winter-Village Communities (Map)	5
2. Twana Ethnic and Linguistic Contacts (Map)	10
3. Swadesh's Version of Snoqualmie Segments (Grid)	25
4. Elmendorf's Twana Segments (Grid)	26
5. The Surface Contrasts of Twana (Grid)	28
6. Tentative Distinctive Features (Matrix) for Twana Consonants .	29
7. Types of Plural in Twana	33
8. Twana Augment Types	37
9. Monosyllabic Stems, Voiceless Obstruents	38
10. Voiced Obstruent and Nasal Stems	39
11. l, w, y Stems	41
12. Disyllabic Stems, Oxytone	47
13. Trisyllabic Stems, Paroxytone	51
14. Augment Clusters	54
15. Glottal Absorption	67
16. Glottal Stop Abutting Voiced Stop	69
17. Glottal Stop in Stems	74
18. Twana Plant Names	78
19. Stem Glottal-Stop Absorption	81
20. Twana Numeral Derivations	83
21. Affix Truncation (possessive)	86
22. Surface Structure for "His berry-bush"	87
23. h- Affection	90
24. ?- Affection	93
25. h- Mutation	94
26. Vowel Assimilation	97
27. C - h Metathesis	99
28. h - Unvoicing of l	101
29. Laryngeal-initial stems	106

Figure	Page
30. Laryngeal-final Stems	111
31. d(n) - Loss	116
32. Shwa Insertion	118
33. Syllabification of <i>ɬ</i>	121
34. Shwa insertion with Nominal and Stative	123
35. Irregular Stress	125
36. Vowel Contrasts	132
37. Tentative Distinctive Features for Twana Vowels (Matrix)	134
38. V ? V Sequences	135
39. Attenuative, Non-Monosyllabic	138
40. Attenuative, Options	146
41. Attenuative, Monosyllabic	147
42. Attenuative, Laryngeal-Initial	149
43. Attenuative, Laryngeal-Final	155
44. Attenuative, non- <i>ʔ</i> h	162
45. Attenuative, with suffix -aɬ	164
46. Attenuative, with Simple Infix	170
47. Twana Consonants and Vowels (Grid)	177
48. Consonant Contrasts, Surface	177
49. Vowel Contrasts, Surface	180
50. Major Class Features (Matrix)	182
51. Vowel Features (tongue-body) (Matrix)	185
52. <i>č</i> / <i>č̣</i> and <i>š</i> / <i>ṣ̌</i>	186
53. k - Forms	187
54. <i>ḳ</i> - Forms	188
55. Salish k - <i>č</i> , x - <i>š</i>	189
56. Rounding assimilation	195
57. Nasals - m	197
58. Nasals - n, ŋ	198
59. m / b and n / d, in parallel environments	200
60. Comparison of Twana b / d, Upper Chehalis m / n	200
61. Contextual Variants of Twana Nasals	203
62. Comparison of Twana y / w, Puget Sound <i>j</i> ~ <i>ʒ</i> , g ~ <i>gʷ</i>	205
63. Twana Voiced Obstruents, non- b / d	207
64. Cavity Features (Matrix)	211

Figure	Page
65. Co-articulation of Vowels	218
66. Twana Vowel Duration	232
67. Manner Features (Matrix)	237
68. Distinctive Features of the Twana consonants (Matrix)	240
69. Morphemes of the Verb system (Selected)	267
70. Morphemes of the Substantive System (Selected)	268
71. The (Free) Personal Pronouns	268
72. General Inflectional Affixes (Selected)	268
73. General Derivational Affixes (Selected)	269
74. Particles (Selected)	269
75. Roots CVC	272
76. Roots CCVC	273
77. Roots CVCC	274
78. Roots CVCVC	275
79. Roots CVCVC	276
80. Roots CVCCVC	277
81. Roots CVCVC, or CVVCVC	278
82. Stems C(V)CVCVC	278
83. Reduplicating Stems	279
84. Inchoative Stems	279
85. Lexical Affixes (Selected)	280

CHAPTER I

INTRODUCTION

I.1. Scope and Intention

Twana (or, Skokomish) is a Salish language, spoken until the early years of the present century along the Hood Canal, on the Olympic Peninsula, in the State of Washington.

This thesis is concerned with explaining a basis for a 'Phonology of Twana.' However, pending the publication of a full-scale Grammar, a very brief characterization of traditional Amerindian type is here given.

The inventory of surface contrasts contains the following segmentals.¹
p p' t t' c c' ~~ç~~ k k' ^wk ^wq q' q' ^wq' ^ws s' ^vl x² x^w x' x' h b² d² (ʒ) (j)
(g) (g^w) (m) (m) (n) w w' y y' l' l' : e e' a a' o o', bracketed segments (probably) only occurring in loan words from European, or other Salish (particularly Puget Sound) languages.

As is common in Salish, multi-membered consonant-clusters are tolerated in Twana, partly consequent on the existence of many morphemes entering into composition with the shapes C, CC. The cluster-resolving status of the 'pepet vowel' (shwa) will be discussed, as will also the light thrown on cluster-limitations by a study of reduplication.

Three degrees of stress (primary, secondary, and 'zero') are found in surface forms.³ Pitch is not contrastive within lexical items: the syntactical function of pitch is badly understood as yet.

From the point of view of syntactic behavior, the major word-classes of Twana are Nouns, Verbs and particles. However, the same roots

¹See Figs. 5, 6, Chap. I, sec. 3.3.3 for surface-contrast grid and Distinctive Feature matrix.

²x is of uncertain status (but see esp. p. 89). ?b/b?, ?d/d? occur, but only as sequences (see Fig. 48, Chap. IV, sec. 1.1 for data).

³Although, for dictionary items, only primary stress (and its position) need be indicated.

so often partake in Noun and Verb stems that it might well be held that the roots of the language are unmarked for subclass, insofar as roots may be dictionary entries. The most important morphological processes are compounding, affixation, reduplication, and accent-shift.

Grammatical categories marked in both Noun and Verb are Augmentative and Attenuative. In the Noun, possession is also marked. In the Verb, major and minor (subordinate) predication are distinguished: in addition, prefixes mark certain aspects and determiners (including agreement for gender and proximity). Suffixes mark inchoative aspect, transitivity (inherent or derived), reflexive, reciprocal, imperative, causative and desiderative, and actor and goal referents.

Especially noteworthy is a set of lexical suffixes (essentially, 'incorporated' object nouns), common throughout Salish, which may be re-interpreted as 'classifying pronominals.'

Particles include interjections, conjunctions, articles and demonstratives, and 'free' pronouns.¹

A characteristically 'Coast Salish' trait is that many adverbs behave as auxiliary verbs, preposed to the main verb.²

The remainder of this chapter presents the background for the study of the Twana language, and concludes with some remarks on the Phonological Component of a Grammar, together with a discussion of the Inventory of segments.

Chapters II and III present the arguments for the basis for a generative phonology of Twana. The taxonomic inventory assumed in the present chapter is re-interpreted in the light of an examination of various crucial aspects of Twana morphology. In particular, an attempt is made to explicate certain problems which recur in other Salish languages. Such are the behavior of the voiced obstruents b,d, in relation to the glottalization of consonants; the role of the laryngeals h,ʔ, in connection with so-called vowel-length, with the derivation of the mid-vowels, and with glottalization generally; the role of accent-shift, and its relation to vowel-loss; and the special status of shwa.

¹See Appendix I, sec. 5.2. Grammatical Morphemes.

²Compare Reichard (1958-60), sec. 12.1, on the stability of certain aspects of Salish structure.

Chapter IV considers the Distinctive Features, based on the definitions of Chomsky-Halle (1968), in the light of the definition of Twana segments, the shapes of Twana morphemes, and the rules of Twana phonology so far established. Some important implications of the notion 'neutral speech-tract',¹ for the definition of Distinctive Features are discussed.

I.2. Background

I.2.1. Location, Population, Culture Area, and Chronology

The language known as Twana or Skokomish (transcribed as Too-an-hooch/To-an-hooch, Sko-ko-mish in the Treaty of 1855²) was at the time of the first attested white contacts³ spoken over the whole of the drainage area of the Hood Canal on the Olympic Peninsula in the State of Washington. Although this constitutes a total area of approximately 750 square miles,⁴ the number of speakers, at least since the end of the eighteenth century, was probably not more than some 500.⁵

Moreover, as Elmendorf points out, we must distinguish the summer from the winter-distribution of the Twana: in winter, the population was concentrated into some nine 'winter village communities,' four along the West bank of the Canal, three along the Skokomish River, and two on the

¹I shall elsewhere show that this notion must be elaborated within a more general account of the Basis of Articulation. In the present context, see Chap. IV, secs. 3.3.1 (the speech-neutral tract) and 3.7.1.2/3 (on the velum).

²Treaty of Point No Point (1855). 'Twana' has no satisfactory etymology.

³Vancouver (1789), Elmendorf (1960).

⁴From the point of view of linguistic contact, such a figure is seriously misleading. As Elmendorf explains, it is important to note that 'ethnic acquaintance' depended not on mere distance but, because of the terrain and mode of transport, on the river drainage systems and on the existence of trails crossing low watershed areas.

⁵Elmendorf (1960) gives the Twana population for mid-nineteenth century as about 1,000, of whom about one-half lived in the Skokomish River drainage area. There are some 500 on the Skokomish Roll today, very many of whom do not live on the Reservation. Cf. p. 6. fn. 2.

South arm of the Canal:¹ in the summer, on the other hand, mixed groups from the various winter-villages inhabited different sites at different times, but most groups found themselves along the Canal at that time, or at their favorite berry-picking grounds. The culture in question, it is to be remembered, was 'food-gathering';² that is, hunting, fishing, and berry-picking were its main means of subsistence.

Comment on the possibility of recovering at least hints on certain dialect diversity within Twana will be found in the discussion of the corpora (Chap. I, sec. 2.4). At this point, suffice to say that what differences there probably were between the dialects of (say) Quilcene in the North, Skokomish upriver from Annas Bay, and Duhlelap to the South-East,³ were levelled progressively from 1859, when all Twana speakers found themselves on the Skokomish Reservation.

Chronology of the Twana culture area

1785-1800	Exploration of NW Coast. Nootka Sound as trade-center.
1790's-1850's	Trade with Hudson's Bay Co. at Ft. Nisqually.
1790	Voyage of Vancouver. First account of Twana.
1800-1810	Founding of Duhlelap winter village. See Fig. 1, site 9.
1811	Foundation of Astoria, on the Columbia River.
1800-1840	Spread of Chinook Jargon to Twana through trade, via Lower Chehalis and Satsop.
	Smallpox epidemics, via same route, affect Twana; thence to Clallam and northwards.

¹See Fig. 1, p. 5. Figs. 1 & 2 are taken from Elmendorf (1960).

²This accords with the characteristics of the culture-area including California, the Basin, the Plateau, and the North-West.

³Elmendorf's (1960) informant told him that the Duhlelap settlement was founded by people from the Skokomish River, probably no earlier than the 1810's. The likelihood of considerable dialect divergence (apart from the 'interference' from the now-adjacent Squaxon village of Allyn) between 1810 and 1859 is small. However, the Duhlelap did resist fusion for a while by settling at Potlatch in the 'removal' period. There may be a link between this fact and the reference to 'Hoodsport talk' by Mrs. Pulsifer (see Chap. I, sec. 2.5).

Note that the name Duhlelap has no Twana etymology, and is known to the Skokomish by the name tx^wlélap. This look like a Common Puget Sound compound (cp. Nisqually; lél 'far,' -ap Common Salish bound pronominal 'end'). Twana 'far' is le'él, and the prefix would in Twana be dx^w-.

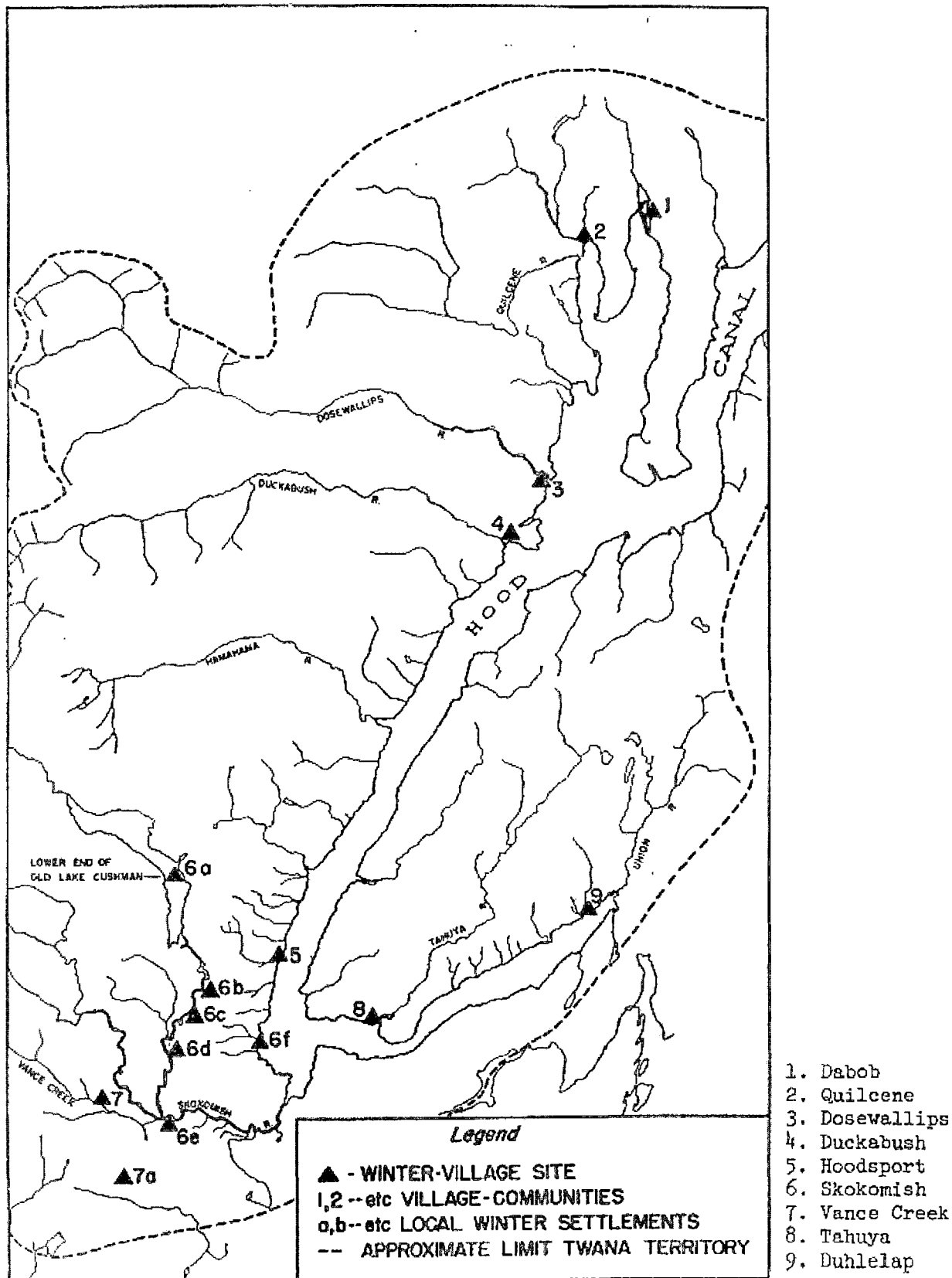


Fig. 1 -- Twana Winter-Village Communities

- 1853 Washington Territory becomes Washington State. White settlement in full flood. Predominance of American traders.
- 1850's Short-lived Catholic Mission among Twana.
- 1855 Treaty of Point No Point, with Clallam, Twana, and Chemakum.
- 1859 All Twana, remnant Chemakum, some Squaxon settled on Skokomish Reservation.
- Relocation of Twana Winter-villages along Lower Skokomish River and along Canal shore inside Reservation.
- 1860-1870 Sporadic missions, Methodist and Methodist-Episcopalian.
- 1870's Reservation School and Protestant mission.
- 1874-1884 The Rev. Myron Eels, ardent and indefatigable, missionary at Skokomish Reservation.
- 1881/2¹ Death and 'resurrection' of John Slocum.
- Foundation of Indian Shaker faith at Squaxon Island. This represented the last attempt at cultural re-integration.
- 1886-1897 Period of Boas-Teit field work on Salish lists, etc.
- 1887 Break-up of the Reservation into allotments.
- 1890-1940 Period of cultural disintegration,² though (largely through the faith inspired by its healing function) Shakerism survives.

I.2.2. Linguistic Affiliations and Areal Features

It is important to note that, although the Salish languages have been undisputedly grouped as such ever since the first word lists taken by Boas and Teit,³ and that the grossest sound correspondences have been sketched out since Boas-Haeberlin,⁴ no thorough-going reconstruction of Proto-Salish has

¹ It is 1881 in Mooney (1892-93); '1882 in Eells,' says Mooney (*ibid.*).

² Elmendorf (1960). Today, the only activities carried out by the Skokomish as a tribal unit are actions at law concerning fishing rights, and inter-tribal baseball. Concern to remain on the Roll of the tribe, similarly, is almost entirely inspired by considerations of land-inheritance and law-suits over Government-acquired timber.

³ For the languages in contact with Twana, at least in the nineteenth century, the lexical similarities are so patent that (e.g.) Eels is clear about the affinity between Twana, Clallam and Nisqually, while noting that Chemakum (a Wakashan language) is unrelated to these. Eels' silence for the case of Spokane, an Interior Salish language, bespeaks the gap between the two divisions of Salish. See Reichard (1960) par. 10, for impressionistic views on mutual comprehensibility.

⁴ Boas-Haeberlin (1927).

yet been undertaken. Taking the Boas-Haeberlin paper referred to, it is to be noted that even the major issoglosses $k/\overset{v}{c}$, $x/\overset{v}{s}$, and i/a show serious inconsistencies as between individual lexical items, and that no attempt is made either to account for these exceptions or to reconstruct whole morphemes where these segments do in fact match.

All the same, Boas-Haeberlin were pioneering inside a language family where the very phonetic nature of the data is generally considered particularly intractable,¹ and it is reasonable to suppose that the major cleavage into 'Coast' as against 'Interior' languages will stand.

The glottochronological assessment of Swadesh,² whatever its theoretical status,³ still confirmed the hypothesized Coast/Inland cleavage, refining the picture only to the extent of separating off both Bella Coola (British Columbia) and Tillamook (Oregon).

The reworking of the glottochronological data by Suttles-Elmendorf⁴ confirms Swadesh's branch classification, but modifies his sub-groupings. In particular, Suttles-Elmendorf integrate Twana within Coast Salish in a chain including North-Georgia, South-Georgia, Puget Sound, Twana, and Olympic:⁵ Bella Coola and Tillamook remain (though detached) members of the same North-South chain.

The evidence for sub-grouping from comparative grammar, sparse as it is, again at least partly confirms the Coast-Inland cleavage; but little work has been done on sub-grouping,⁶ which must await the publication of descriptions of far more languages than we yet possess. It is sufficient to recall, as an example, that Swadesh classified Tillamook as an independent division, while Reichard suggested a special relationship between Tillamook and Interior Salish.

¹ Compare remarks in Swadesh (1952), par. 2.

² Swadesh (1950), repeated in Swadesh (1952).

³ Cf. Bergsland and Vogt (1962). ⁴ Suttles and Elmendorf (1962).

⁵ Challenged in Dyen (1962), but re-affirmed by Elmendorf (1968).

⁶ The dangers of working with tiny areas of structure, as well as with diverse techniques is well illustrated in Elmendorf's study of the Salish numerals; his 'chain' here changes its internal ordering to: Tillamook, Twana, Puget Sound, Olympic. On the other hand, Suttles' analysis of pronominal-usages shows the most distinctive systems to belong respectively to Bella Coola, Tillamook, and Kalispel/Coeur d'Alene, the language areas which are (at least today) most marginal to the family.

In view of the paucity of our knowledge of the internal history of Salish, any discussion of wider affiliations, whether within 'Mosan' or even 'Mosan-Algonkian'¹ must to a large extent be fruitless at this time. Beyond cataloguing the fact that such hypotheses exist, this thesis can have nothing to say on such a topic.

On the other hand, it is important to point out that the languages of the Pacific North-West constitute an extremely interesting Sprachbund. To cite only phonological evidence,² we note that Jacobs (1951) includes the following commonalties (all found in Twana) as characteristic of the area.³

1. Mid-palatal as well as velar stops and continuants, both rounded and unrounded.
2. At least two laterals, *l* and *ɭ*. Some add *ɬ*.
3. At least *p, t, c, k, kʷ*, in addition to 'plain' counterparts.
4. The glottalized resonants *ɣ̚, w̚, l̚*.
5. Lack of interdental or labio-dental continuants.
6. Tolerance of complex consonantal clusters.
7. Variation of vowel-quality correlating with stress.

As will be recalled (see Chap. I, sec. 1) Jacobs' points 4 and 7 are of special interest for Twana. The question of clusters is also to be dealt with.

I.2.3. Contact Languages

As has been shown above, little can be said of possible earlier groupings within Salish which might correlate with any putative Twana Ur-Heimat.⁴ We confine ourselves, therefore, to two kinds of contact-language situation: the immediately adjacent language areas; and the influx of European

¹Swadesh (1953). For earlier references to these larger groupings, see Boas (1911), Frachtenberg (1920), Sapir (1929) and Andrade (1933).

²For morphology, consider Reichard (1958-60), 12.1, Newman (1968), Hamp (1968).

³Passing over special exceptions, such as the lack of labials (saving only *w*) in Tillamook.

⁴For a putative Salish Ur-Heimat, see Jacobs (1937), and Elmendorf (1962).

loans (perhaps largely) through the Chinook Jargon, the lingua franca of the area for some 100 years.

As will be seen from the accompanying sketch-map (Fig. 2) Twana was abutted to the North and North-West by Clallam and Chemakum, to the East and South-East by 'Puget Sound', and to the South-West by Satsop, a dialect of Chehalis. Of these, all but Chemakum¹ are Salish, although none would be intelligible to a monolingual Twana-speaker.² Apart from the possibility of some Hood's Canal place-names proving ultimately to be of Chemakum origin, no immediately obvious influence of Chemakum is apparent in Twana.³

I.2.3.1. Clallam

Eels (1887) asserts that no Clallam (save only criminals, and then only for a short period!) were sent to the Skokomish Reservation, despite the terms of the Treaty.⁴ On the other hand, Eels (1886) mentions Clallam as one of the four languages spoken on the Reservation, while Elmendorf (1960) cites the borrowing of the secret-society ritual as well as (perhaps) some of the main elements of their large-scale, inter-tribal give-away feast as evidence of an intimacy of long standing between the two tribes. Inter-marriage and visiting were common by 1850 and it is important to note, from the point of view of possible linguistic borrowing, that the Clallam were the more prestigious.

I.2.3.2. Puget Sound

Puget Sound Salish comprises a chain of mutually intelligible dialects flanking Puget Sound to the North-East, East and South-East,

¹Chemakum is of Chemakuan stock, with Quileute as the second member.

²A personal opinion, based on observation: my main informant spoke Nisqually to a Nisqually once in my presence; the Nisqually, however, was unable to understand more than occasional single words of Twana. There were probably few Twana who remained mono-lingual.

³By 1859 (founding of the Skokomish Reservation) the Chemakum were practically extinct, as a result of wars, though the remnant did manage to flee to the Skokomish Reservation.

⁴The Treaty (of Point No Point) provided specifically for Clallam, Chemakum, Twana, and Skokomish. It is entitled 'Treaty with the S'Klallam, 1855.'

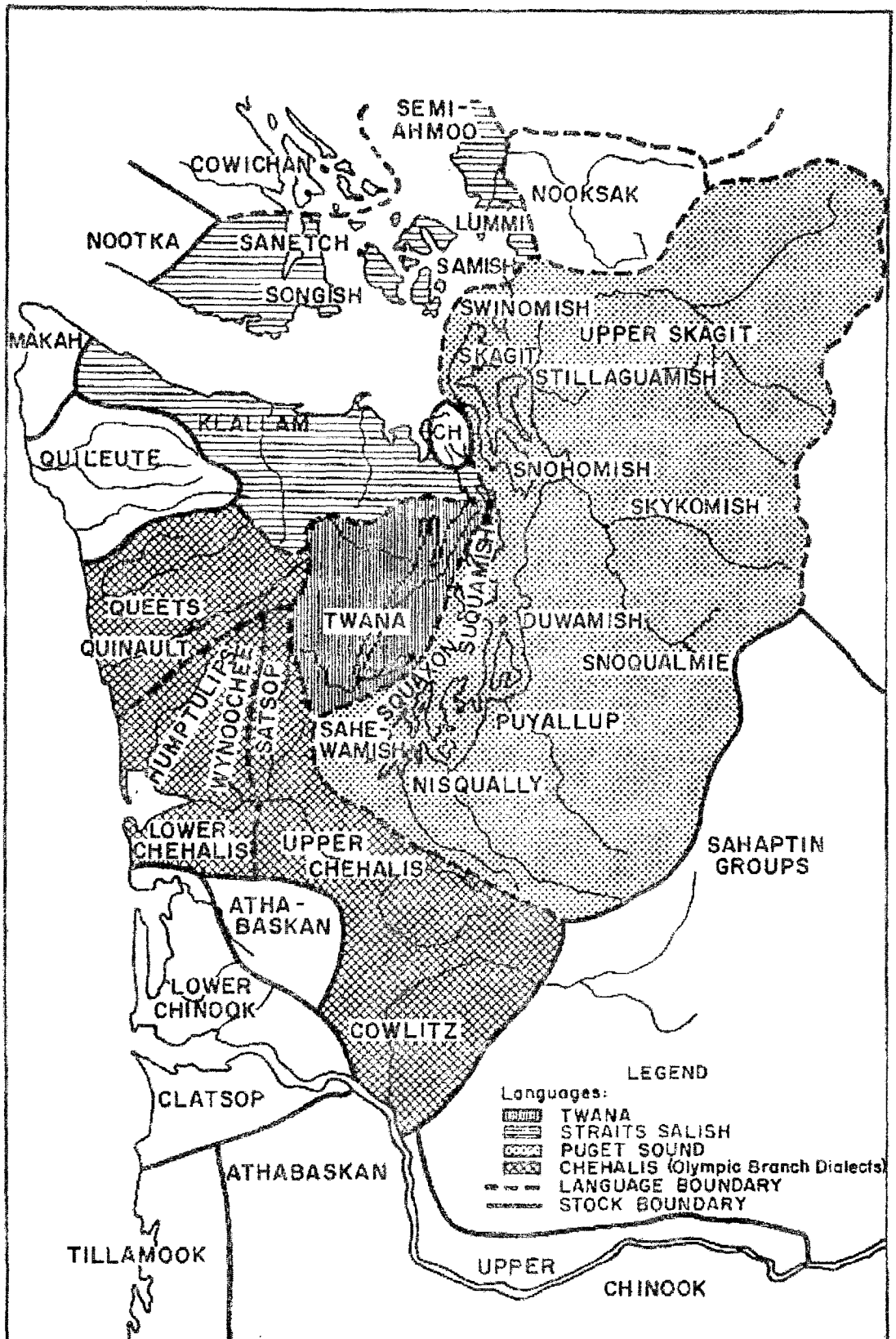


Fig. 2 -- Twana Ethnic and Linguistic Contacts

within a line drawn from Mt. Baker southward to Mt. Rainier then West and North-West to Olympia and Shelton,¹ and flanking Western Puget Sound to the East of the Twana area. The dialects of immediate interest as contacting Twana are Sahewamish (location of modern Shelton), Squaxon, and Suquamish.²

While there is no special genetic relationship between Twana and Puget Sound, it is noted that some thirty Squaxon³ speakers moved onto the reservation at its formation; moreover, the Squaxon were sufficiently close and intimate, partly no doubt through the proximity of (Squaxon) Allyn to (Twana) Duhlelap,⁴ to partake in the most intimate of the intercommunity activities, the eating contest.⁵

1.2.3.3. Satsop and Lower Chehalis

To the West, the Olympic Range presented a barrier apparently not permitting more than casual (hunting-party) contact with the Quinault. To the South-West, however, an overland trail must have existed from pre-contact times via the Satsop and Chehalis Rivers to Grays Harbor and the Pacific coast. While intermarriage also occurred between the Twana and the Lower Chehalis (though limited to upper-class families), participation in the eating contests as well as intermarriage characterized the Satsop-Twana relationship as particularly close. There remaining no speakers of Satsop,⁶ only close comparative study between Twana, Upper Chehalis and Lower Chehalis will throw any light on possible Satsop influence on the Twana language.

¹Hess (1966).

²As Elmendorf (1960) points out, it is interesting that the name Suquamish admits of an etymology in Twana but not in Suquamish.

³'Squaxonites, speaking Nisqually.' See Eels (1886). Puget Sound has (1965) perhaps four speakers.

⁴'At least since the early nineteenth century when it was probably founded as a Skokomish 'colony.'

⁵Elmendorf (1960), Table 4, p. 303.

⁶'Satsop was a minor dialect situated geographically and linguistically medially between Upper and Lower Chehalis.' Kincade (1963-64).

In the light of the foregoing, it is not difficult to see that cultural and linguistic factors conspired to force Twana speakers to learn at least one, perhaps two or even three 'foreign' languages,¹ quite apart from the question of the chronology of the spread of English. In the 1880's the missionary Myron Eels preached in Chinook, while it is clear from present-day informants that "everyone knew the Nisqually language, but they spoke to the 'Pastæds' (white people) in Chinook, the older ones who didn't know 'Pastæd' (English)."

Multi-lingualism being thus the norm for such a culture-area, rates of diffusion of loan material, whether lexical or morphological, might well be considerable.²

On the other hand, the circumstances making for diffusion can hardly at the same time be responsible for what amounts to an opposite trend, viz. the widely-commented-upon lexical diversity between Salish languages.³

1.2.3.4. The Chinook Jargon

There is some evidence that Twana familiarity with the lingua franca of the North-West coast, the Chinook Jargon, was in the first place by direct contact of Twana traders, via the Satsop Trail mentioned above. Elmendorf's informant suggests that such trading visits to the Columbia River were 'either post-white in date or stimulated largely by white trade.' If this is true, we can date the influx of European (and other Chinook-

¹ It is interesting to note that 'No one from outside ever learned Twana. Everyone said it was too hard' (informant comment). Cp. also Elmendorf's informant (1960).

² For an extension of this argument to the whole of the Pacific North-West Sprachbund, see Jacobs (1951). Elmendorf (1951) suggests name-taboo as an important source of lexical replacement in Twana. However, he offers but one convincing example, the replacement of *čátas* 'stone' by *q̣wáléʔlas* 'cooking stone.' Even in this case, Elmendorf confesses that the taboo was not extensively agreed to. In any event, the present writer's main informant retains the 'original' form, and did not recall a taboo on this word.

³ In contrast to the supposed stability of the grammar--a supposition which we can hardly claim has been very thoroughly substantiated, despite Reichard's list of features already referred to.

mediated) loans into Twana¹ as beginning in the late eighteenth century. On the other hand, Eels (1887) tells us that of the Reservation population, 'all but the very old and the very young speak Chinook.' This suggests that Chinook had gained widespread use in Twana territory only by the 1820's or 1830's.²

Mention has already been made (see Prefatory Note) of the non-native segmental phonemes involved, and further discussion will follow in the phonological analysis. Some interesting cases occur of loan words containing unassimilated non-native segments yet exhibiting complete assimilation to native morphological patterning.³

I.2.4. Previous Study of Twana

In describing a language no longer viable, and moreover a language with only two or three living speakers, one welcomes any source of materials from which to determine how far the present informants' speech is idiosyncratic in any important respect.

In the present case, six such sources exist.⁴

1. Eels 1877, 1881, 1887, 1889.
2. Boas-Teit 1890's (?):(B) Boas-Haeberlin 1927.
3. Gunther 1945.
4. Elmendorf 1946, 1951, 1954, 1960, 1961(A), 1961(B), 1962(A), 1962(B).
5. Swadesh 1951, 1952.
6. What in effect constitutes a sixth source of data is the existence of a tape recording⁵ of the speech of Liza Purdy, the (deceased) mother of one of the living speakers. We shall refer to this material as Corpus 6.

¹From the point of view of geographical proximity, forms via Upper Chehalis are likely to be present.

²Conversely, this also suggests the rate at which English was becoming the 'native' language of the Skokomish Twana. Mrs. Pulsifer (the main informant), though multi-lingual (Chap. I, sec. 2.5) knows but little Chinook Jargon.

³See Chap. IV, esp. secs. 3.7, 3.8.

⁴For full references, see bibliography.

⁵Generously made available for copying by Mr. Leon V. Metcalf of Seattle, Washington (1963).

We here characterize the contents of each source in a very general fashion.

We first omit from discussion part of Corpus 2. This consists of lists of lexical items, gathered by the authors in the course of field-work, and potentially of great interest but not available to me at the time of writing. Some of the items of Corpus 2 are reproduced as examples in Boas-Haeberlin (1927). We shall refer to this latter 'corpus' as Corpus 2(B).

Corpus 5 (1951) is likewise not available. It consists of 200 Salish cognate sets, a sample of which appear in Swadesh (1952). This sample will be referred to as Corpus 5.

Corpus 1 designates the word-lists scattered through Eels' publications on the Twana. It is of interest as containing items (such as month-names) no longer remembered¹ by speakers even at the time of Elmendorf's field work (mainly 1939-40), although Eels' orthography presents considerable difficulties. A feature unique to this corpus is that it contains (1881) a 'Grammar of Twana.' Although unfortunately only two pages in length, this Grammar contains a number of points of interest. Again despite orthographic problems, three short Hymns in Twana (Eels, 1889) are of great interest.

Corpus 3 contains botanical terms, some of interest morphologically, although here again orthography is a problem.

Corpus 4 consists of several hundreds of words, together with a number of phrases and sentences and a few song-texts, scattered through the publications of Elmendorf. Elmendorf discusses a single lexical suffix (1960, p. 129); he also cites 'bound forms' and suppletives in numerals 1-10 (1962B).

Only Swadesh (1952) and Elmendorf (unpublished) make any attempt at phonological analysis,² but both stop short having stated the inventory of phonemes. Differences in phoneme inventory between the two will be discussed under Segment Inventory (Chap. I, sec. 3.3). Neither 4 nor 5 contains any systematic discussion of morphology.

¹Some month-names were recalled by Mrs. Pulsifer when read to her from this list.

²Eels (1881) does give 'the letters of Twana.' His transcription and the interest in his forms generally will be discussed in another place.

1.2.5. Field Situation and Informants

On the Reservation itself, Twana has long ceased to be a language in daily use, and the number of very old people who remember even single words¹ is progressively diminishing with their death. What is worse, almost all the very few speakers are either involved in or intimidated by the waning but still practiced Indian Shaker faith, the practitioners of which are resolutely opposed to the disclosure of what are for them 'the secrets of the tribe.'²

The extreme case of secrecy is exemplified by Lee Cush, the Shaker minister (73 years old), whom I have heard praying (1964-1965) in Skokomish as well as in the Chinook Jargon, but who refused to allow recordings or even to discuss the language. His attitude is particularly regrettable in that his father³ had been among the last residents at Quilcene, and it is possible that his speech may contain elements of interest for Twana dialectology.

The only Reservation informant comparatively uninfluenced by the Shakers is Archie Adams (79 years old). However, he proved to be unable to recall more than a very few single words, and even then offered 'Puyallup' (better, Puget Sound) forms much of the time.

Sickness, accompanied by an inability to concentrate for usefully long periods of time, made Mrs. Emily Miller (73 years old) a less than invaluable informant. Her involvement in the Shaker faith was no doubt (though never overtly so) an additional factor in her seeming unwillingness to act as an informant. Only single words were elicited from her directly. On the other hand, by a dramatic stroke of good fortune--the circumstances

¹Two or three words (sex references, and the word Pástad 'white man') are still current, even among very young children.

²Difficult as it is to assess, one must not overlook the influence of missionaries here. Feelings of shame at supposedly heather wickednesses were no doubt partly responsible for a reluctance to recount myths other than those already adapted to missionizing purposes, of which the legend of the Flood is the most notable.

³Elmendorf (1960) made a very limited use of Lee Cush's father (Charley). We note that the impediment then, too, was the presence of the son Lee, who was already a Shaker minister.

being her recognition of the voice on the 'Liza Purdy' tape-recording (Corpus 6) as that of her own mother--it was possible to gloss and at least partly analyze three valuable texts.¹

The main informant was Mrs. Louise Pulsifer (83 years old). Badly crippled, toothless, almost totally blind and in constant pain, Mrs. Pulsifer slowly (over three summers, 1963-1965) remembered her language. Though multi-lingual (speaking Clallam, Puget Sound, Skokomish, and English) she was always scrupulous in distinguishing 'the genuine old Skokomish language' from other speech, even to the point of characterizing Mrs. Miller (for example) as 'from Hoodspout'--a characterization which may throw some light on the dialect of Duhlelap. Despite infirmities and continual harassment (through jealousy as well as the tribal pride mentioned above), Mrs. Pulsifer dictated forms and tape-recorded and aurally checked texts for as many as six hours a day. Let it be a tribute to her that it is very largely her data² that enable us to reconstruct, however roughly, the phonology of the Skokomish language.

One hundred-word (Swadesh-type) lists were elicited from and tape-recorded by the following further informants.

1. Eddie Beattie (77 years old) at Tacoma.³ Mr. Beattie has been in contact with Puget Sound for so many years that he has largely confused his native Skokomish with it.

2. Mrs. Hattie Cross (70 years old) at Puyallup. Mrs. Cross is the daughter of Henry Allen (main informant of Elmendorf [1960]), but has lived at Puyallup (Puget Sound speaking) since she was fourteen years old. She remembers single words of Skokomish, but confuses Skokomish with Puget Sound.

3. Mrs. Irene Teoh/Baptist (50[?] years old) at Wapato, Yakima. Reputedly⁴ speaking Skokomish fluently, she nevertheless proved impossible

¹To be discussed elsewhere.

²Henceforth, 'main corpus' (or 'corpus') refers to Mrs. Pulsifer. Other Corpora will be referred to specifically, where appropriate.

³Later, at Puyallup (1965).

⁴Testimony of Mrs. Pulsifer.

to work with (1964) because of the belligerent attitude of her husband.¹

I.2.6. Character of the Main Corpus

The main corpus consists of (a) word-lists and sentences, all also tape-recorded, together with paradigms, some tape-recorded; (b) texts, all tape-recorded (but not all transcribed).

I.2.6.1. The Word Lists

The field work for this thesis was supported by the Survey of Northwest Languages, financed by the National Science Foundation, administered (1963-65) by the University of Washington. This project has a double aim. It seeks first to furnish full descriptions of a number of strategically-chosen Salish languages, of which Skokomish Twana is one. It then proposes to attempt the reconstruction of Proto-Salish on the basis of these descriptions. To the latter end (that is, to ensure the comparability of materials from the languages to be described), a basic list² of some 700 lexical items and morphological features was selected, all likely to be reproducible in all the languages concerned. This list is entitled 'The Northwest Word List,' and its content constitutes the core of the vocabulary lists. It was supplemented by items found in texts, elicited during the analysis of texts or general discussion of the culture, or simply volunteered by the informant. The field situation made it unwise to spend much time in systematically constructing a dictionary of Skokomish. Some three thousand lexical items are filed, in addition to which there

¹Mrs. Baptist, having separated from her husband, later (1965) lived at Toppenish, Yakima. It is hoped to work with her in the future; she is likely to prove an important source, especially since 'interference' from Yakima languages (non-Salish) should be minimal and easily screened out.

²The list is in fact divided into two parts: 'Short Northwest word list,' and 'Word list 2.' The first contains 350 items selected from the semantic fields of quantity, people and kin, body parts, colors, natural phenomena, directions, animal life, plant life, materials and food, adjectives, and operations.

The second part of the list contains less 'basic' items, and includes terms for objects and phenomena particular to the area and the culture, e.g., names of berries known to be used as food, words connected with canoe transportation, etc.

Both parts of the list are at present under revision (1968).

were re-elicited the 179 place-names in Elmendorf (1960), together with related items.

Within the limitations imposed by the language¹ and the patience of the informants, paradigms were elicited wherever possible. Although this thesis makes use of only a few paradigm types, it is worthwhile to comment briefly on their importance generally for the establishment of appropriate underlying morpheme-shapes.

Crucial are details of pronominal reference and relation of the syntax of 'free' objects to that of the corresponding embedded pronominalizations of objects (the so-called lexical or 'field' suffixes).

Other important ways in which paradigms are essential are, e.g., in the determination of the position of pronouns with adverbs, and (most perplexing) the elucidation of the transitivity system.²

So far as elicited forms are concerned, there is inconsistent treatment of subject and possessor gender as marked in the determiner (article and demonstrative) systems; this may be due to genuine loss of the distinction--we find this loss of distinction in non-human animate noun forms--but it may equally have arisen in the corpus through confusion in eliciting.

In the circumstances, little more has been done with the syntax of Twana than to taxonomize the surface constructions found in texts and citation utterances. The deep semanto-syntax, with its problems of lexical selection, etc., is for the moment beyond our reach. In any case, this thesis has only incidental remarks to make on syntax, in the discussion of phonological boundary markers.³

¹The universal difficulty in obtaining paradigms for certain crucial parts of Salish morphology has been noted by many workers (e.g., Thompson, personal communication). The problem is acute for the aspectual and subject-object relationships. The more than ordinary burden which this places on text-collection is not aided by the impossibility of recording even a single conversation in Twana. The 'cleanest' texts (i.e., those clearest of false starts, hesitations, etc.) are those concerning Myths and Fables; but these are precisely the texts which it proved impossible to use as jumping-off points in the paradigm quest, since they are in a sense 'canonized' in the informant's memory.

²Cf. Hess (1967) for important insights on this as well as on aspect and reference.

³The important and complex problem of stress assignment in

I.2.6.2. The Texts

In the light of the imminent extinction of the Skokomish language, it was considered expedient to tape-record as many texts as possible, even though it was not feasible to transcribe and check even the majority of them before leaving the field (1965). Here it is sufficient to characterize the text corpus for its content and its importance to a linguistic analysis of Skokomish.

The types of content are: Myth and legend, ethnography and fables, everyday narrative, biography and autobiography, and songs.¹ Although I have overheard conversations in Skokomish between Mrs. Pulsifer and Mrs. Miller, it never proved possible to transcribe or even tape-record any piece of dialogue in Skokomish. The Myth of The Flood I was able to record on two separate occasions; I shall comment elsewhere on the degree of consistency between the two versions. For the moment, it is to be noted that the comparatively 'fixed' status of such a text suggests we may recover archaic forms from it; conversely, the same fact makes it all the more important to possess day-to-day narratives against which to measure the archaisms, whether of lexicon or of grammar.

Texts were elicited in various ways: by free recall, for the Myths, ethnography, biography and autobiography; for some legends and fables in Elmendorf (1961B) not previously known to Mrs. Pulsifer, by reading the story to the informant in English,² followed by free recall; and by reading the Skokomish transcript, and reconstitution of the text as a joint endeavor, in the case only of Eels' (1889) Skokomish hymns. An attempt to control the content of the recall more closely by telling a story sentence by sentence resulted only in very obvious syntactical calques, although the text remains of some value for its unusual lexical content.³

complex forms, such as those with bound pronominal classifiers, is thus only partially solved; it is hoped to elucidate this problem when the syntax has been further studied.

Note that Quileute shows similar problems (Hamp, personal communication). This is probably an areal phenomenon.

¹ I managed to elicit only one song in Twana. Elmendorf (1960) offers an explanation for the lack of Twana song-words.

² Mrs. Pulsifer is quite illiterate.

³ 'The War of the Animals with the South Wind.'

No place is to be found in this thesis for any literary or ethnographic discussion of the texts,¹ although the analysis of the content, stylistics and manner of story-telling here must some day be compared with Elmendorf's account of the same and similar texts dictated in English.²

On the other hand, there are several purely linguistic features of these texts that must be noted.

First, the texts contain many hesitations, repetitions and even acknowledged 'errors.' It is difficult to be certain of the status of some of these 'errors'; there is more than a suspicion that, as the informant became more sophisticated in one sense, she also acquired a new notion of correctness, and condemned some of her earlier (and perfectly 'well-formed') contractions and other alternations.

Second, the grossly-overlength vowels and very rich intonation patterns in these texts, some of which are delivered with a surprising amount of subtle variation in speed and rhythm, is often completely at odds with the conception of stress and stress-alternation gained in the eliciting of single words and simple phrases.³

I.3. The Phonological Component

I.3.1. General

Within a generative framework, the Phonological (P) Component of a grammar is that part of the total grammar which associates the surface syntactic structure of utterances with their phonetic representation.⁴

¹But see the brief comments of this type accompanying the Tale (Appendix I, sec. 2).

²Elmendorf (1961 B), esp. pp. 5-7.

³No systematic treatment is given of the additional (or alternative) rules required to generate the sandhi variations due to speed of utterance, though sporadic remarks will be found in the Commentary to the Tale (Appendix I, sec. 5). Again, Quileute shows remarkable similarity (Hamp, personal communication).

⁴Chomsky (1965) et al.

We are here concerned with that part of the P-component of Twana having as its input and output strings of segments, labelled and bracketed to show their Immediate Constituent structure; each string represents a morpheme of Twana, bounded by suitable markers, and each individual segment is represented not by an indivisible alphabetic symbol, but by a matrix of binary-feature specifications.¹

We accept the view that the general conditions under which particular morphemes may be said to belong to a language are a proper part of the description of the competency of a speaker of that language; nevertheless it is neither desirable nor feasible to introduce those conditions into the description in the shape of 'morpheme-structure rules' in the P-component.² Thus, it is assumed that, both in the dictionary and as entering the P-component, all segment matrices are fully specified for all binary features relevant to the phonological rules of Twana as a whole. Such an assumption automatically renders impossible certain devices which have been shown to produce illusory economies, either in the dictionary entries or in the rules themselves.

Segment strings thus fully specified are conceived of as submitted to a set of rules which may perform certain operations on them. Those rules may add, delete, or permute segments; or they may change the binary values of specified features within given segments.

In classical phonemic theory, which strictly separated the levels of phonetics and phonemics, all the rules relating each level to the next were necessarily applied simultaneously. We adopt the contrary view, that the prohibition against the mixing of levels not only has no theoretical justification, but that the simultaneous application of rules in fact detracts from their explanatory power, and may even lead to absurdities.

Consider the following simple example from Twana. That s-nominal assimilates its point of articulation to a following palatal is clear from

¹Despite scepticism (cp. Ladefoged [1965]), it is generally assumed that 'narrower' phonetic specification is to be gained through the use of non-binary values assigned to distinctive features; for other views, cp. Ohman (1966) on co-articulation, and Kim (1966). See also p. 196, fn. 4

²Stanley (1965, 1967). Compare Halle (1959) for the earlier (and contrary) view.

the forms: s-táb 'when'; s-cób³ 'crab-apple'; but s-cáb³sáb 'gift.'

An extremely simple rule handles the case; say, for simplicity,

$$s \rightarrow \check{s} \text{ in env } /- \& \check{c}$$

However, taking the stem déc³ 'graze, scratch' we derive the stative unaugmented form as-déc³, but as-dc-déc³ with Augment. Clearly, a cluster-simplification rule operating on as-dc-déc³ precedes the rule for assimilation of s-nominal (see cluster-simplification Chap. II, sec. 7 for discussion). Notice now that any attempt to frame the original rule as applying simultaneously forces us to amend it as follows:

$$s \rightarrow \check{s} \text{ in env. } -\& (d) \check{c}^{(?)}$$

But although this formulation guarantees the correct output, d cannot plausibly be said to be an environment in which s becomes š. Thus a phonology which prizes explanatory power cannot in principle consist of a set of unordered rules.

It is not only through the principle of ordering that a generative phonology gains its explanatory power. The adoption of explanatory power as a criterion also affects radically the choice of the feature-composition of the segments to be distinguished from each other. Again, a simple example from Twana will clarify the point at issue.

We shall suggest that glottal stops are in certain cases lost when adjacent to m, n in 'native' morphemes but not in 'non-native' morphemes. To distinguish these situations, we shall not set up 'M/N' and 'm/n,' which can fairly be characterized as an unrevealing analysis;¹ rather, we shall attempt to justify the view that we have to do with voiced non-obstruents which become voiced obstruents, as against voiced non-obstruents which remain so. This question is discussed at length in the text (Chap. II, sec. 8).

Finally,² it must be pointed out that an even stronger claim has

¹For a 'pre-generative' insistence on plausibility of explanation as against mere inventory-economy, see Bazell (1954). Here, we shall not say 'the Morphophonemes M/N become b/d in certain environments, otherwise m/n; the Morphophonemes m/n always become m/n.' The morphophoneme, thus used, has predictive power, but no explanatory power.

²Further remarks concerning the structure of the P-component will be found in the text and footnotes *passim*. The impact of 'marking' on phonological theory, and the implications for the analysis of data such as that handled by this thesis are not yet clear enough to warrant further discussion here.

been made than the simple renunciation of the separation of levels in phonology: this is the counter-claim that phonology is not an autonomous part of the grammar of a language. On the contrary, it has been shown that the proper formulation of the rules of the P-component presupposes a knowledge of the kind and amount of constituent structure falling within the domain of particular rules.

This insight concerning the nature of phonology is formalized in three ways. First, in the annotation of rules to indicate their domain in terms of the ranks of boundaries; for example, while Twana Nasals become obstruents, they may retain a nasal onglide in 'word-initial' position. Similarly, rules may be marked to apply only at stem boundaries, etc. Second, many rules are limited in their application to certain morphological categories; in Twana, the loss of a morpheme-initial vowel (Rule 4, Rule Summary 6) occurs only in the Attenuative formation.

Third, we must consider the notion that rules are to be applied cyclically¹ (i.e., as a block, to ever-larger amounts of constituent structure). There is some indication that Twana rules operate cyclically (Chap. II, sec. 20), but a richer analysis of surface constituent structures and their derivation will no doubt clarify this matter.

I.3.2. The Data To Be Utilized

Chapters II and III present the arguments which will motivate the final selection of the total roster of binary features to be used for the phonology of Twana, that is, those features to be used in both dictionary representations and rules.

I have chosen to explicate in detail the 'productive' aspects of two important morphological processes in Twana, viz., those of the Augment and the Attenuative,² the motive for choosing these particular processes being as follows.

The morphophonemics of the Augment presents a suitable mass of

¹Chomsky, Halle, Lukoff (1956) contains the earliest account of the notion and its application to English. Cf. Chomsky-Halle (1968) Chap. III.

²For instance, we do not discuss the phonology of some small classes of suppletive 'augments' and 'attenuatives' only referring to these insofar as we shall suggest in principle how the dictionary is marked to handle them.

consistent and controllable data, from which it is possible to explain the sources of a large proportion of the occurrences of glottal stop in association with *i*, *w*, *y* found in Twana forms, as well as the alternations in the position of these glottal stops in the segment-strings concerned. The same body of data also enables us to explain and formulate rules for three important types of cluster-resolution in Twana, viz., metathesis, simplification, and glide-insertion.

This main topic, the Augment, together with the discussion of other related phenomena (such as stress-alternation) also found elsewhere in Twana morphophonemics, will occupy the whole of Chapter II, which thus largely defines the consonants of Twana.

Chapter III, in turn, deals with the morphophonemics of the Attenuative. This will enable us to develop in a motivated manner the proper specification of the vowels of Twana; in particular, plausible sources¹ will be suggested for the vowels *ε* and *ɔ̃*, as well as such alternations as *e/ə ~ ε̃ε̃, ε̃*; and *o ~ ɔ̃ɔ̃, ɔ̃*.² However, the derivation of these alternations is intimately bound up with the behavior of *h* and glottal stop. We shall thus deal first with the phenomena of *ʔ*-affection and vowel-assimilation, integrating the rules we develop into the set already established for the Augment, and then relate the rules as a whole to the problems of the Attenuative.

Chapter IV will then attempt to integrate the understanding gained on the behavior of Twana segments, and will take certain crucial rules as examples before finally summarizing the characterization of Twana segments in Distinctive Features.

¹In the present context, 'source' is simply a short-hand for 'underlying representation recoverable through the existence of alternations governed by rules of the grammar.' There is no implication of 'historical source,' although neither is this in principle denied: compare Bloomfield (1939).

²It is thus a convenient, although not in the least misleading simplification, to omit from consideration in Chap. II (The Augment) the very few forms in which *ε* and *ɔ̃* must be treated. In this way, we avoid the disjointedness which would result from a partial discussion of the Twana vowels at this point, and accordingly relegate that topic to the Introduction to Chap. III (The Attenuative).

For the moment, it is recalled that the vowel phonemes of Twana, defined in terms of surface contrasts, are *e*, *ε̃*, *ə̃*, *ɔ̃*, *o*, and *a*.

1.3.3. The Segment Inventory

1.3.3.1. Swadesh's Inventory

Taking the phoneme chart of Tweddell¹ as a base, Swadesh comments: 'If one omits the voiced ʒ ʝ g^w from the Snoqualmie table, one gets the system found in Twana.' Swadesh's analysis here is thus based entirely on 'various MSS in the Boas collection of the American Philosophical Society, especially Boas' Comparative Salishan vocabularies (ca. 1925),'² since no large-scale work on Twana had been published at that time.³

p	t	x	c	ɕ	k	k ^w	q	q ^w	ʔ
p	t	x	c	ɕ	k	k ^w	q	q ^w	
b	d	[ʒ ʝ]				g ^w			
(m)									
	ʃ	s	ʃ	x	x ^w	x	x ^w		
w	l	y							
u		i					a		

Fig. 3.--Swadesh's version of Snoqualmie Segments
(with modifications for Twana)

Swadesh has correctly seen that the voiced obstruents ʒ ʝ g^w are found only in loan words. It is also easy to understand the inclusion of the affricate x , which in fact only occurs (a) as a rare free (ill-understood) variant of ɕ , and (b) for $\text{t} + \text{t}$ at morpheme boundaries.

¹Tweddell (1950), p. 3 (consonants), p. 9 (vowels).

²Swadesh (1952), p. 238.

³I.e., 1952. Elmendorf's field-work was done between 1939 and 1956. His doctoral dissertation was written in 1948. I am not aware whether Swadesh had access to this work, nor whether any phonological matters are discussed in it. The earliest phonological analysis made by Elmendorf is probably that summarized in the chart accompanying his word-lists of 1954 (see discussion below, Chap. I, sec. 3.3.2).

The omission of shwa is more serious, and can only be attributed to a theoretical predilection: Swadesh was, as commented upon elsewhere (Chap. II, sec. 20.1), much concerned with the non-phonemic status of what Boas had called 'the pepet vowel.' It will be seen that shwa indeed has a special status in Twana, but this is far from agreeing with Swadesh's view that it has no status.¹

As will be seen from the corpora for Twana in Chapters II and III, I have no certain cases of x, the front-velar spirant,² and can only surmise (since I do not have access to the Boas MSS referred to above) that the forms which Swadesh is using may well show the affricate on-glide to velars.³

I.3.3.2. Elmendorf's Inventory

p	t	x	c	c̣	k	k ^w	q	q ^w	ʔ
p	t	-	c	c̣	k	k ^w	q	q ^w	
b	d	-	-	-	(g)	-			
(m)	-	-	-	-	-	-			
-	s	ʃ	-	ʂ	x	x ^w	x	x ^w	(h)
w	-	l	-	y					

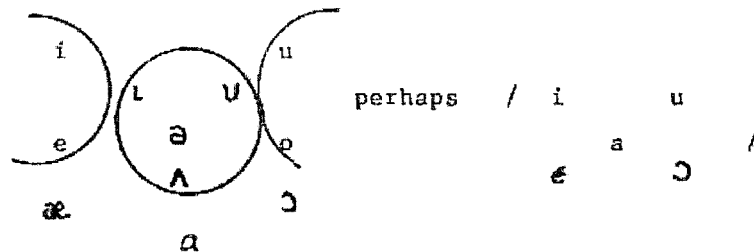


Fig. 4.--Elmendorf's Twana segments (1954). (Rearranged for comparison with Swadesh's chart)

¹See Chap. II, sec. 4, for shwa in stems, and Chap. IV, sec. 4.4. for shwa as lax.

²See Chap. IV, sec. 3.5 for the sound-shift effectively removing x from the Twana inventory, and sec. 4.2 (p. 214, fn.3) for another explanation.

³Cf. Chap. I, sec. 3.3.2 in Elmendorf's inventory, and Chap. IV, sec. 4.2.

As will be seen from the above figure, based on Elmendorf's, χ^2 occurs, but not χ , although Elmendorf notes the allophonic (sic) status of the latter. The segments m and g are bracketed, with the comment 'phonemic status doubtful.' At this stage of his field-work, Elmendorf had collected comparatively few lexical items (approximately five hundred appear in the list referred to), and it seems his judgments are based on frequency of occurrence. The same hypothesis would explain the omission of n, as well as his bracketing of h at this time.¹ The inclusion of x, as commented on above (re Swadesh), seems again based on Elmendorf's interpretation of the on-glide to a velar, this time following the vowel e.²

So far as surface-contrast analysis is concerned, the suggested distribution of vowel allophones and their assignment to phonemes is largely confirmed by the analysis in this thesis, with the special exception of the treatment of shwa.³ However, it is not possible to comment on the implications for Elmendorf's later analysis of Twana, on the basis of his remarks in 'The Structure of Twana Culture' (1960), since the inventory listed there is expressly intended to cover both Twana and the neighboring western Washington Indian languages.⁴

1.3.3.3. The Inventory of this Thesis

Figure 5 presents the contrasting (surface) segments of Twana⁵ to be utilized in this thesis.

We tentatively adopt a feature-composition of segments,⁶ more or

¹See Elmendorf (1961) where h is included without comment.

²Cf. his $d\acute{x}^w h\acute{a}d\acute{x}q^w b\acute{a}d$, $st\acute{x}q\acute{e}y\acute{u}$, with $d\acute{x}^w h\acute{a}d\acute{e}q^w b\acute{a}d$, $st\acute{e}q\acute{e}w$ of the present corpus. Note that the Augmented $sqt\acute{e}q\acute{a}w$ establishes the representation $*st\acute{e}q\acute{e}w$: see Chap. II, sec. 4, $\tilde{V} \sim a$. Cf. Chap. II, sec. 15.7 on Ch-metathesis; and Chap. IV, sec. 4.2 for another interpretation.

³See Chap. IV, sec. 4.4.

⁴Author's note, par. 10.

⁵For illustrative data, see Chap. IV, sec. 1.1. For shwa, see also Chap. IV, sec. 4.4.

⁶As explained above (Chap. I, sec. 3.2), the Twana vocalisms are not discussed in Chap. II. The introduction to Chap. III will give a tentative feature analysis for the vowels, to be modified as dictated by the shapes of the rules and the required phonetic output (see also Chap. IV, secs. 3.3 and 4.4).

¹ p	¹ t	¹ c	¹ č	¹ ʃ	¹ k	¹ k ^w	¹ q	¹ q ^w	ʔ
p	t	c	č	-	k	k ^w	q	q ^w	
-	-	s	š	ʔ	[x] ¹	x ^w	x	x ^w	h
b	d	(ʒ) ¹	(ʝ) ¹	-	(g)	(g ^w)			
¹ m	-	-	¹ y	¹ l	-	¹ w			
m	n	-	y	l	-	w			
		e ²	ə			o			
		ε	a			ɔ			

Fig. 5.--The surface contrasts of Twana

¹Bracketed segments are found only in loan words (see Chap. IV, secs. 7, 8). The segment [x] is in doubt (see Chap. IV, sec. 3.5).

²Elmendorf's choice of /ɛ, o/ was obviously made on typological grounds: by far the most frequent allophones are [e, o]. See Chap. IV, sec. 3.3.2 for discussion.

less mechanically substituting the names of binary features for the articulatory terminology we employed above; the text will establish our motivation for any modifications we shall hereafter make.

The transcription of all forms in the figures and text of Chapters II and III (The Augment and The Attenuative) are in terms of the above (surface) contrasts, and utilize the symbols of this grid. Chapter IV (The Phonetic Output) and the Appendices, on the other hand, employ different transcriptions¹ for different purposes.²

¹See Chap. IV, sec. 3.3. and Appendix I, sec. 1.

²Main conventions used are:

- * Underlying representation
- ** Incorrect form
- // 'Phonemic' representation, only in Appendices
- \$ Utterance, initial or final
- # Word, initial or final
- & Morpheme boundary in rules
- Morpheme boundary elsewhere

	p	t	c	ʔ	č	k	k ^w	q	q ^w	b	d	(ʒ)	(j)	(q)	g ^w	(m)	(n)	l	w	y	s	š	ʒ	[x]	x ^w	x̣	x̣ ^w	h ^l	ʔ ^l	
cons	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	+	+	+	+	+	+	+	+	+	+
voc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
obstr	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+
nasal	-	-	-	-	-	-	-	-	-	(+)	(+)	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-
cont	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	-
grave	+	-	-	-	-	+	+	+	+	+	-	-	-	+	+	+	-	-	+	-	-	-	-	-	+	+	+	+	+	+
round	+	-	-	-	-	-	+	-	+	+	-	-	-	-	+	+	-	-	+	-	-	-	-	-	-	+	-	+	-	-
lateral	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	+	-	-	-	-	-	-	-
diffuse	+	+	+	+	-	-	-	-	-	+	+	+	-	-	-	+	+	+	+	-	+	-	+	-	-	-	-	-	-	-
strident	-	-	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
retracted	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+			
checked	†	†	†	†	†	†	†	†	†	-	-	-	-	-	-	†	-	†	†	†	-	-	-	-	-	-	-	-	-	+

Fig. 6.--Tentative distinctive-features (matrix) for Twana consonants

() Denotes segments attested only in loan words.

[] Denotes a putative segment, the distinctiveness of which is to be debated in the text (Chap. IV, sec. 3.5).

† Signifies a (surface) segment occurs for each value.

¹The assignment of h/? to [+Obstruent] makes it impossible to distinguish ? from q. We shall show that h/? must be treated as semi-vowels (see Chap. II, sec. 18; cf. also Chap. IV, sec. 4.3).

CHAPTER II

THE AUGMENT

II.1. The Morpheme Strings Involved

Preparatory to the discussion of the phonology of noun and verb reduplication as exponents of 'Augment,' we briefly characterize the (minimal) strings of morphemes involved.

The majority of Twana verb roots are of the shape CVC. Since third person singular subject commonly has the phonological shape 'zero,' the intransitive verb stem with 'unmarked' aspect may appear in the shape of the bare root.

Examples:

pák ^w	makes a spot on	k ^w óy	bends
k ^w áp	corrects	žéq	reddens
so ^x	grinds	žák ^w	pierces
q ^w ál	paints	žób	heals, scars
yáq ^w	washes	lép	covers

The corresponding forms for 'continuative' aspect simply prefix be- to this stem; thus be-q^wéc 'he's dancing.' For the 'stative' aspect, in turn, the prefix žas- is prefixed instead; thus, žas-pák^w 'spotted.'

It might be maintained that, apart from particles, all roots in Twana are verbal. This would imply that all Twana nouns are derived from verbs; we here give some examples of such derived nouns, taking for simplicity the least complex derivational process, viz. the Nominal in s-.

Examples:

<u>Verb Root</u>		<u>Derived Noun</u>	
téq	close	stéq	log jam
žáx ^w	freeze	sžáx ^w	ice
žés	help	sžés	power (spirit-given)
q ^w éc	dance	sž ^w éc	dance
žóc	rain	sžóc	rain

q ^w ác	vomit	s ^w q ^w ác	vomit
x ^w ák ^w k ^w	breathe	s ^w x ^w ák ^w k ^w	breath
p [?] ác	defecate	s [?] p [?] ác	ordure
?élád	eat	s [?] ?élád	food ¹
?élal	sing	s [?] ?élal	song
?óbát	name	s [?] ?óbát	name
?éwad	invite	s [?] ?éwad	invitation

Despite the theoretical claim that all roots in Twana are basically verbal, there remains an unhappily large number of noun stems as yet unrelatable to any corresponding verbal root. Of these, some are found as citation-forms with s- nominal prefix, while others lack this prefix.

The presence or absence of the s- nominalizer does not seem predictable for stems not directly derivable from verb roots; the dictionary entries for such s- forms must accordingly contain s-. We give examples of non-derived nouns with root-shapes CVC and CVCVC, citing s- and non-s- forms.²

Examples:

<u>CVC</u>	<u>s- nominalizer</u>		<u>no s- nominalizer</u>	
	s ^w xác	rib	čát	elder brother
	s ^w scák ^w	angle-worm	k ^w óy	mother
	s ^w péx ^w	gull	čáp	aunt
	s ^w xóp	bracelet	ǵác	stomache
<u>CVCVC</u>				
	s [?] stácád	slave	čálaš	hand
	s [?] ščátas	stone	k ^w opéc	master
	s [?] qáboł	dug-out canoe	yádés	tooth
	s [?] teqéw	horse	báq ^w ab	field
	s [?] yaláb	year	waqáb	box
	s [?] abáded	mountain	łók ^w al	moon

¹There are a few 'frozen' noun forms, derived from verbs but lacking initial ?. Such are s[?]abád 'half-brother' (cf. ?el-sáq 'split,' sáq 'split') and s[?]élad 'provisions'--although the glosses for s[?]élad and s[?]?élád were sometimes reversed by the informant.

²The lack of near-minimal pairs for the monosyllabic forms is attributed to the limitations and accidents of the corpus, rather than to any kind of complementary distribution.

CVCVC s-nominalizerno s- nominalizer

ʔébæc	grandchild
ʔásax ^w	seal
ʔádəč	species of duck

There is a clear distinction between forms with s- nominalizer and those in which s is part of the root. In the case of noun and verb roots in association with 'augment,' s-initial takes part in reduplication, while s- (nominalizer) and ʔas- (stative) do not.¹ This may be briefly illustrated by the following examples:

Examples:

<u>Unaugmented</u>	<u>Augmented</u>	<u>Gloss</u>
	<u>s as root-initial</u>	
sél	səlʔ -sél	cloth
sóq ^w ay	q ^w -sóq ^w ay	elder sister ²
s-sqáče(h)	s-q-sqáče(h)	finger
ʔas-sót-čəd	ʔəs- t-sót-čəd	I know ³
	<u>s- as nominalizer</u>	
s-táčəd	s-tč-táčəd	slave
š-čótax	š-čt-čótax	halibut
s-teqéw	s-q-téqaw	horse
ʔas-čóc	ʔas-čč-čóc	it's old ⁴

¹Only one form occurs in which the grammatical prefix apparently partakes of the reduplication. This is ʔasčáx^w; təsx^w sx^w čáx^w 'old; elders'; from te- article, def; s- nominalizer; x^w - agentive (?); čáx^w root.

²The Corpus is unfortunately not so rich that we are always able to select data showing only the point under discussion. Morpheme-boundaries are therefore indicated (e.g. ʔas-tč-táčəd) where this facilitates matters. In the present case, the obscuring factors are cluster-simplification (q^w -sóq^w ay), geminate simplification (ʔəs-t-sót-čəd), and s- assimilation (š-čt-čótax).

³ʔas- ~ ʔəs- alternation. See Chap. II, sec. 3.2.

⁴Ibid.

II.2. Taxonomy

II.2.1. Plural Types

	<u>Unaugmented</u>	<u>Augmented</u>	<u>Gloss</u>
(a)	tabéd	təq ^w 1-tabéd	hair
	yəšád.	təq ^w 1-yəšád.	foot; my foot ¹
	wədáw?	həhí? tə-wədáw?	horn
		~ həhí? təq ^w 1-wədáw?	
	spo'yálapabš	dos-šá?láb čt-po'yálap	the Clallam Puyallup; the Puyallup (tribe) ²
	sk ^w áx ^w səd	čö-sk ^w áx ^w səd qəx-obəš	Sqaxon; the Squaxon big tribe
<hr/>			
(b)	sx ^w éxay	sx ^w éxay-óbəš	sheep
	bók ^w	bók ^w -óbəš	book
	čáí	təq ^w 1-čáí-óbəš	night
	steb ^w át	həhí? steb ^w át-óbəš	man
	q ^w oq ^w š?	sq ^w oq ^w š? bəš	creek; the Skokomish
		səhéwəbəš	the Suwamish
		šxššəxtəd	parents
<hr/>			
(c)	ččá'yac	qé?ə qpaí	child
	šéq ^w ade(h)	ščəbáde(h)	cheek
	seséd	pəsát	big
	dəcəh	debát	I, we
	də'wéh	təwəl ^w álap	you, ye
	bə'áhtəbastčəd	bečx ^w ščəd	I'm killing him, lots
	ʔabótdəx ^w	íaqél ^w ətx ^w	sit down! ³
	ʔas-ástadbəčəd	ʔasčálap	I'm standing up; they're -

Fig. 7.--Types of Plural in Twana

¹d- Possessive 1st singular. For d-loss, see Chap. II, sec. 19.
Here, *təd-q^w1-yəšád.

²spo'yálapabš shows (irregular) vowel-retentions--probably a loan form.

³Probably *óh, with stress-retraction (see Chap. II, secs. 15.3, 21);
thus *íaqél^wətx^wóh.

Before embarking on the main theme of this chapter, we shall briefly survey the total range of 'plural' in Twana. Since it is not the purpose of this thesis to examine Twana syntax as such, sufficient examples are given only to clarify co-occurrence possibilities and to avoid the cruder semantic ambiguities.

Certain 'plural allomorphs,' it will be suggested, are perhaps best re-assigned the status of collectives, others that of quantifiers.

Examples Fig. 7(a) illustrate the use of six prefixes making plurals. q^w1- ¹ may be used alone, but is most frequently found in conjunction with $ta-$.² $həh^5?$ 'lots' is a free form, best considered a general quantifying adverb; it may be used together with $ta-q^w1-$. $dos-$ occurs only once in the corpus for Twana.³ On the other hand, $čt-$ is a common collective prefix used with tribe names. The homonymy with the prefix $čt-$ 'decade' as in $čt-bósas$ 'forty' is almost certainly not accidental. $č-$ is occasionally used with tribe names. $qəx-$ ⁴ occurs three times in the Corpora, in $qəx-obəš$ 'big tribe,' $qəx-tələh$ 'lots of money,' and $qəx-édə?wat$ ⁵ 'wise: clearly an adverbial prefix of 'magnitude.'

Examples Fig. 7(b) illustrate the use of the suffix $-óbəš$. $-(V)mš$ is in widespread use within Salish, both in tribe names and as a generic pluralizer. In Twana its use seems to be even wider, for it is clear from texts that there is no 'generic' limitation.⁶ The suffix $-təd$, on the other hand, is found only once, in 'parents.'⁷

¹Cf. Upper Chehalis (Boas [1934]) "collective" $-q^w1?-š$ (a suffix!). Also Kincade (1964).

²Cp. Kincade $ta-$, as well as $ta-q^w1?š$, *ibid*.

³I have presently no check, but the informant's Clallam background makes me suspect a direct loan from Clallam. Cp. $nš-tn$ (below, this section).

⁴Cp. $ta-qəx1$, and ($qəx1$ 'many'), in Upper Chehalis (Kincade, *ibid*).

⁵ $tələh$ 'money,' European loan; $édə?wat$ undoubtedly related to $yədə?wás$ 'heart.' The $s \sim t$ alternation is obscure.

⁶For example, $bók^wobəš$ 'books' is used of a small number of quite specific books in an autobiographical text.

⁷Compare its use in 'instrumental' nominalizations of the type $səp-təd$ 'club,' from $səp$ 'to strike.' Also compare Upper Chehalis type $nš-tn$, used only with kinship terms.

Examples Fig. 7(c) are of suppletive plurals, a very limited class in Twana.¹ The verb forms (except 'killing lots') are probably verbs of group or collective activity.

We take now representative corpora of Twana forms showing that allomorph of 'plural' which consists of a pre-posed unstressed reduplication of all or part of the initial CVC- of the root. The definition of what exactly is pre-posed, it is noticed, is here left somewhat vague, for reasons that will become apparent as the argument progresses.²

The lexical items to which such an Augment is pre-posed correspond roughly³ to English Noun and Adjective. Some preliminary examples are given below.

Examples:

<u>Unaugmented</u>	<u>Gloss</u>	<u>Augmented</u>	<u>Gloss</u>
š-čótax	halibut	š-čt-čótax	halibut (coll)
s-pəčo	berry-basket	s-pč-pəčo	berry-baskets
ʔas-pós	having a boil	ʔs-ps-pós	having boils ⁴
ʔaš-šéc	paid	ʔs-šc-šéc	all paid
ʔaš-čél	lazy	ʔs-čl-čél	all lazy
ʔas-x ^w é ^l -čəd	I'm lost	ʔs-x ^w al ^l -x ^w é ^l -čəd	I've lost them

We notice immediately another respect in which the English glosses may be most misleading. Whereas for the Twana noun the addition of the augment corresponds fairly well with English plural agreement, the Twana verb

¹'Child' may contain -pał (cf. Reichard [1933] 390--'a plural prefix [sic] meaning 'boys')). But cf. also Kalispel -ul (collective); Twana -ʔal, 3rd person plural, also wəł 'and'; also possible is a root *qəp plus Attenuative -al (see Chap. III, sec. 7).

²Because of special problems associated with h and glottal stop as C₁ or C₂ of stems, we reserve these for separate treatment (Chap. II, sec. 17).

³English glosses can be very misleading. For example, 'fire' in Twana is ʔas-q^wat, clearly a stative form.

⁴Another dangerous gloss. In Twana, 'having x' is rendered bəs-, as in bəs-čə^wáščəd, 'I've got a wife' (čə^wáš, 'wife'). Here, better 'be-boiled'; 'all-be-boiled.'

augment may correspond to English glosses denoting multiple subject, multiple object, or even increased or totally achieved action.¹

However, the 'augment' is by no means an obligatory agreement in Twana, even in the absence of any other agreement marker² in the same phrase, as the following examples will illustrate in simple fashion:

Examples:

q^wʕəbətəb təd-yaǵód my legs frightened them.
x^wʂʔək^ws ʔas-sót-qə-təbs ləs-xčád they didn't understand what
t-q^wéc ləc-láwalbəš would happen.
the people were dancing.

[Compare yəš-əd; šeʔyəšəd 'foot; feet.'

ʔas-sót; ʔas-st-sót 'know' : (ʔas-sót-qə-čəd 'I understand')

táwalbʒs; 10²-táwalbʒs 'Indian: Indians.'

II.2.2. Augment Types

Considering only the shape of the reduplicating syllable, surface forms of the following types are found in Figure 8.³

Type (a) = $C_1 C_2^4$; $C_1 \otimes C_2$; $C_1 \otimes C_2^7$

(b) = C₁ o ; C₁ o ? ; C₁ e ?

(c) = C_2 ; $C_2 v_1$; $C_2 a$; $C_2 o$; $C_2 e$?

Cross-cutting this taxonomy, however, are the following features.

- (a) Vowel-loss in the stem - e.g. 'ear'
 (b) Vowel-gain 'cockle'
 (c) Vowel-gain " " 'gather' (V ~ a)
 'sunk' (V ~ a)
 'sing' (V ~ o)

¹'Increased action' is, for Twana, not synonymous with 'intensive,' for which another type of reduplication (stressed C₁V₁) is employed.

²It is probably best to consider the augment, so far as verbs are concerned, as including both number and aspect. It is really number, then, that may remain unmarked, in both noun and verb. (Compare p. 49, fn. 1.)

³ Compare the taxonomic analyses in Kincade (1964), Hess (1966) for Upper Chehalis and Snohomish. I hope to show elsewhere the rule-governed relationship between the forms for these languages and those of Twana, at least as far as Augment and Attenuative are concerned.

⁴C₁, C₂ refer to stem consonants.

apart from questions of constituent structure), the features involved appear again and again in Twana morphophonology.

The remainder of this chapter will be devoted to a re-analysis of substantial sub-corpora of data such as that given above.¹

II.3. Monosyllabic Stems

II.3.1. Voiceless Obstruent Stems

<u>Unaugmented</u>	<u>Augmented</u>	<u>Gloss</u>
	<u>Nouns</u>	
s-tá ^v čəd	s-tč-tá ^v čəd	slave
čát	čt-čát	elder brother
š-čótax	š-čt-čótax	halibut
š-čátas	š-čt-čátas	stone
k ^w áčaptəd	k ^w c-k ^w áčaptəd	blanket
s-q ^w ólqabəc	s-q ^w l-q ^w ólqabəc	blue-bill
s-qá ^x əd	s-q ^x -qá ^x əd	snail
q ^w ópaptəd	q ^w p-q ^w ópaptəd	cushion
	<u>Verbs</u>	
ʔas-póc	ʔas-pc-póc	floating
ʔas-pək ^w	ʔas-pk ^w -pək ^w	spotted
ʔas-táč	ʔas-tč-táč	put on
ʔas-téč	ʔas-tč-téč	pulled
ʔas-łóc	ʔas-łč-łóc	knotted
ʔas-sót	ʔas-st-sót	known
ʔas-šó ^x	ʔas-š ^x -šó ^x	ground up
ʔas-šéc	ʔas-šč-šéc	paid
ʔas-k ^w áp	ʔas-k ^w p-k ^w áp	corrected
ʔas-q ^w ól ^x	ʔas-q ^w l-q ^w ól ^x	hidden
ʔas-qá ^x	ʔas-q ^x -qá ^x	frozen

Fig. 9.--Monosyllabic Stems, Voiceless Obstruents¹

¹C₁ and C₂ are voiceless.

From a consideration of Figure 9 we might tentatively characterize the augment as a reduplication of shape C₁C₂, i.e., a copy of the first two consonants of the root.

¹No apology need, I trust, be made for the somewhat pedagogical step-by-step nature of the treatment, which is adopted partly because the data will be unfamiliar to most readers, but also to ensure the vulnerability of the argument at all points.

Two other points of interest are the following: There is an alternation in the shape of the 'stative' morpheme, giving $\text{ʔas-} \sim \text{ʔas-}$. For the moment, it is not clear whether this alternation is associated with unaugmented as against augmented forms, or whether the conditioning factor is purely phonological, e.g., remoteness from stress.¹ The morpheme $s-$ (nominal) assimilates its point of articulation to a following initial ʃ or č .²

II.3.2. Voiced-Obstruent and N Stems

<u>Unaugmented</u>	<u>Augmented</u>	<u>Gloss</u>
	<u>Noun</u>	
sə-báded	sə-bəd-báde(d)	mountain ¹
báde(h)	bəd-báde(h)	child ²
$\text{s-}q^w\text{óbay}^?$	$\text{s-}q^w\text{əb-}q^w\text{óbay}^?$	brain
$\text{k}^w\text{ábaləx}^w$	$\text{k}^w\text{əb-k}^w\text{ábləx}^w$	root (of tree)
təbéx^w	təb-təbax^w	land, earth
cədəl	cəd-cədəl	he
bəqsəd	qə-bəqsəd	nose
	<u>Verb</u>	
ʔas-lób	ʔas-ləb-lób	scarred
ʔas-xéb	ʔas-xəb-xéb	wrinkled
ʔas-qəbác	ʔas-qəb-qəbac	shrunk
$\text{ʔas-x}^w\text{əd}$	$\text{ʔas-x}^w\text{əd-x}^w\text{əd}$	tired
$\text{ʔas-k}^w\text{ədád}$	$\text{ʔas-kwəd-k}^w\text{ədád}$	held
$\text{ʔas-xəd}q^w\text{-če(h)}$	$\text{ʔas-xəd-xədaq}^w\text{-če(h)}$	sore hand ²
ʔas-báx	ʔas-xə-báx	worn out
$\text{ʔas-məx}^?$	$\text{ʔas-xə-məx}^?$	proud

Fig. 10.--Voiced Obstruent and Nasal Stems³

¹See Chap. II, sec. 8 for d-loss finally.

²See Chap. II, sec. 5.

³ C_1 or C_2 , or both, as voiced stop or nasal.

Comparing Figures 9 and 10, fresh problems emerge; but so also do tentative solutions to problems already encountered. First, we are so far

¹Which proves to be the case (see Chap. II, sec. 3.2).

²Except in slow (citation) speech, s -nominal is lost when it geminates with s , or with ʃ (i.e., after assimilation).

unable to decide on the status of the -ə- segment for the form səbədə: səbədəbədə(d) 'mountain.'

We note too that, regardless of the vowel in the first syllable of the root, a ə appears in the reduplicating syllable for all the forms of Figure 10. It is reasonable to associate this with the occurrence of voicing in either of the consonants involved in the reduplication. However, the content of the corpora so far cited does not allow us to decide whether this ə segment is best treated as a weakened grade retention for the cases concerned, or whether we must consider it as an insertion.¹ The latter solution, it is important to note, perhaps allows a simpler statement of the rules for reduplication; but this in itself would not be conclusive.

We note, in forms such as təbək^w : təbtək^w 'earth,' and ʔəsəqəbək : ʔəsəqəbəkək 'wrinkled,' an alternation in stress between unaugmented and augmented forms. Tentatively, we may say that in the presence of the augment, the stress shifts to the first syllable of the root. This we shall later confirm from other cases, and shall discuss fully (see Chap. II, sec. 4).

We note, too, that for those forms with alternating stress just referred to, the stressed vowel of the unaugmented form is normally replaced by a in the augmented form; the exception in this corpus is bəqsəd : qəbəqsəd 'nose.' We shall return to this alternation in detail (Chap. II, sec. 4) below.

The form bəqsəd : qəbəqsəd² 'nose' itself, entered in Figure 10 as an exception to the vowel-replacement just discussed, is also, however, an example of another phenomenon to be treated in detail below; this is the problem of cluster-simplification,³ which also involves the forms for 'worn out,' 'proud.'

One problem carried over from Figure 9 may, on the other hand, now be profitably mentioned again. The existence of unaugmented forms such as

¹For the shwa-insertion condition in this case, see the argument on p. 44. Further discussion on the wider application of such a rule will be found at Chap. II, sec. 20 'shwa insertion.'

²The importance of forms of the type bəqsəd : qəbəqsəd 'nose' extends to their bearing on the problem (already mentioned) whether certain ə occurrences are best considered as retentions or insertions. It is crucial that in q-ə-bəqsəd, it can only be an insertion. The exceptionality of qəbəqsəd as regards the a-alternation is explained at Chap. II, end of sec. 5.

³Chap. II, sec. 7.

ʔasxədəq^wče(h) 'sore hand' shows clearly that the alternation ʔas-~ʔəs- in the stative prefix cannot be associated with the alternation 'unaugmented~augmented.' The alternation is now seen to be connected with the proximity of stress, or rather with its remoteness. The rule will be formulated more precisely when we have considered further evidence on vowel-reduction in general.

II.3.3. l, w, y Stems

Unaugmented	Augmented	Gloss
	Noun	
(a) sēla(h)	səlʔ-sēla(h)	grandfather
səlqəd	səlʔ-səlqəd	shell
q̄wéle(h)	q̄wəlʔ-q̄wéle(h)	cedar tree
sxáltəd	sxəlʔ-xáltəd	cradle-board
čálaš	čəlʔ-čálaš	hand
q̄wəláde(h)	q̄wəlʔ-q̄wəláde(h)	ear
yálʔšəd	yəlʔ-yálʔšəd	moccassin
-wəlap	təwəlʔ-wəlap	you ¹
bále(h)	bəl-bále(h)	fish roe
	Verb	
ʔas-qáldəx ^w	ʔəs-qəlʔ-qáldəx ^w	don't want
ʔas-qálabdəx ^w	ʔəs-qəlʔ-qálabdəx ^w	prepared
ʔas-čél	ʔəs-čəlʔ-čél	lazy
ʔas-x ^w əl	ʔəs-x ^w əlʔ-x ^w əl	picked
ʔas-q̄wəláb	ʔəs-q̄wəlʔ-q̄wəláb	sunk
ʔas-x ^w élʔ	ʔəs-x ^w əlʔ-x ^w élʔ	lost
ʔas-xəlʔ	ʔəs-xəlʔ-xəlʔ	marked, written
(b) ləwalbəš	ləʔ-ləwalbəš	person, Indian
q̄wəʔáče(h)	q̄wəʔ-ləwəče(h)	cane; walking-stick
wədawʔ	wədʔ-wədaw	horn, antler
ʔas-ləwəʔldəb	ʔəs-ləʔ-ləwəʔldəb	left behind
ʔas-wəʔak ^w	ʔəs-ləʔ-wəʔak ^w	crazy
wəqəb	q̄ə-wəqəb	box
yədəs	yədʔ-yədəs	tooth
yəšəd	šəʔ-yəšəd	foot
ʔas-yášədəl	ʔəs-šəʔ-yášədəl	carrying a baby on the back
kəya(h)	keʔ-kəya(h)	grand-mother
ʔas-kwóy	ʔəs-kwəʔ-kwóy	bent
kwóy	kwəʔ-kwóy	mother
s-čáʔyat	s-čəʔ-čáʔyat	salmon-gill

Fig. 11.--l, w, y Stems

¹ Unaugmented 'you' is unstressed; only used as enclitic.

We examine next the behavior of l, w, y in reduplication (Figure 11). For simplicity of exposition we have cited reduplications involving l separately from those involving w and y, since the latter introduce further complication owing to their simultaneous function as non-obstruents and semi-vowels.

We note that if there is an l, w or y¹ in the root, a glottal stop often appears in the reduplicated (i.e., the augmented) form. This at once distinguishes l, w and y from b, d², roots with which never behave in this way, as may be seen from Figure 10. To formalize the distinction we have made, we reformulate our first observation as follows: 'if there is a non-obstruent, non-nasal segment in the (initial CVC of a) root, then . . . ' We tentatively characterize such a segment as a 'resonant.'³

Unless further complications disallow it, we shall tentatively treat the stem glottal stop in forms like yál¹šad as a 'separate' segment. This does not necessarily imply a similar treatment for the added glottal stop in Augmented forms, a fuller justification of which must be sought.

In their function as 'resonants,' w and y clearly behave in similar fashion to l; that is, their occurrence in roots often gives rise to a glottal stop in the augmented form, as may be seen from Figure 11(b). However, a number of important observations must now be made concerning Figure 11(b) (as against Figure 11(a)).⁴

Certain forms (e.g., wəqáb; qə-wəqáb 'box') fail to show the expected glottal stop; some forms (e.g., k^wóy; k^weʔ-k^wóy 'mother') show an alternation between y/e (as also w/o) in the augmented forms; one form (wədawʔ; wədʔ-wədaw 'horn, antler') shows loss of glottal stop in the augmented form; while for the last form of the corpus (s-čá²yat; s-čeʔ-čá²yat 'salmon gill') it will be

¹bále(h) 'fish-roe,' bóle(h) 'spring (water),' bol¹óq^w 'tangle' are forms that do not follow the rule; the importance of such forms will be shown later (Chap. II, sec. 9).

²The corpus contains no n-forms, and only one m-form, in augment.

³It is not implied that 'resonant' is considered a distinctive feature; it is merely a convenient cover-term.

⁴For the form q^wáláde(h); q^wál¹-q^wálde(h), with the stressed vowel of the unaugmented form lost in the augmented form, see 'Tri-syllabic stems with second-syllable stress' (Chap. II, sec. 5).

seen that we must sometimes postulate an underlying representation of more abstract shape than that of the unaugmented form.

Now it is clear that these anomalies are all closely bound up with the behavior of the glottal stop found in the augmented forms, and that our earlier statement on the conditions for the appearance of glottal stop in those forms must be refined.

We have stated that this glottal stop is often produced in association with roots containing at least one 'resonant,' the glottal stop then occurring between the reduplicating syllable and the root. We note that it always occurs if a 'resonant' stands finally in the reduplicating syllable, regardless of the nature of the initial consonant.

From Figure 10 in particular, we further observe that no glottal stop arises in the augment where the reduplicating syllable (CVC) contains b or d as one consonant, and any other non-'resonant' consonant, regardless of which of the two stands syllable-final.

It is thus reasonable that we should associate the appearance of the glottal stop with the occurrence of l, w, y, but not with the occurrence of b, d. However, if this is so, then augmented forms such as wəd¹-wədaw 'horns,' and yəd¹-yədaw 'teeth' present a puzzle. As we have just shown, the glottal stops in these forms are to be associated with the presence, not of the syllable-final d in the reduplication, but of the syllable-initial w and y. We are thus motivated to ask why the glottal stops in these forms are in fact heard after the end of the reduplicating syllables.

Consonant with the view¹ that the proper formulation of a rule handling an irregularity in a grammar must follow from the most plausible explanation of that irregularity, we offer the following tentative explanation of the apparent anomaly in the shapes of the above forms.

First, we assume that the glottal stop arising in augmented forms constitutes a separate segment--as, indeed, we have (although so far merely for typographical convenience) written it.

Second, we shall hold that this glottal stop derives from the lost vowel in the unstressed reduplicating syllable. However, the derivation

¹ It will easily be seen from the following discussion that a 'morpheme-alternant' analysis would necessarily be extremely complicated, involving many quite ad hoc riders to account for the alternations found.

can hardly be a direct one; rather, we propose that the 'lost' vowel is first unvoiced, and that the loss of 'position' features which this entails results in a segment which we shall identify with 'h.' It is this 'h' which then dissimilates its continuousness (becoming glottal stop) if its abuts a voiced consonant, but is otherwise lost.¹

Thus, we shall require two ordered rules to produce the augmented glottal stop: (1) Reduplicating vowel becomes h

(2) h in the Augment becomes ʔ in certain environments.

It may be argued that the present formulation is to be less prized than one in which the lost vowel becomes glottal stop directly, since we have used two rules instead of one. But it is clear that the criterion of economy is here to be over-ridden by that of naturalness, a claim which we shall fully justify later² by showing that other instances of glottal stop must in turn be derived directly from h.³

If we adopt the two assumptions made above, then the following implications are to be reckoned with. If the glottal stop referred to derives from an 'original' vowel in the reduplicating syllable, then obviously the rule for reduplication must specify a vowel as well as the C_1C_2 already established. This vowel could logically be any Twana vowel whatever. It could in fact be shwa. However, there are many cases (some already cited) where a shwa appears in the reduplicating syllable of the augmented form, in addition to the glottal stop. This shwa (as in the forms ʔ^wəl^ʔ-q^wéle(h) 'cedar trees' yəd^ʔ-yádas 'teeth') cannot, of course, come from the 'original' vowel in the reduplicating syllable, even in a weakened grade, but must be the product of an epenthesis rule.

To allow this epenthesis rule as wide a power of application as possible, we now assume that all shwa vowels appearing in the unstressed syllables of augmented forms are attributable to it; this extension of the rule thus also provides a source for the shwa in forms such as k^wábələx^w; k^wəb-k^wábələx^w 'root.'

¹See Chap. II, sec. 7 ('Augment clusters'), where the Y-metathesis rule forces us to modify this position somewhat. For a richer account of the derivation of glottalization, see Chap. IV, sec. 4.4.

²See Chap. II, sec. 15.4 'h - mutation.'

³Compare the discussion in Sapir (1938).

We cannot prove this with the data so far presented,¹ but we nevertheless find it most plausible to assume that the reduplication rule for the Augment specifies 'a copy of the first vowel of the root.' It is this vowel which yields the h from which the Augment glottal stop derives.² A shwa vowel is later inserted (again, in specifiable environments) in certain reduplicating syllables.³

We turn next to the shifted glottal stop in forms with roots of the shape 'resonant' -V-b/d, raised for the cases of wədʔ-wədaw 'horns,' and yədʔyədās 'teeth' above. What has happened here is to be characterized as 'glottal metathesis,' the glottal stop having been attracted by the stress. The appropriate rule, tentatively formalized below,⁴ may clearly be generalized to account for the shift of all glottal stops generated in augmented forms, to the end of the reduplicating syllable. Within this framework, wədʔ-wədaw and yədʔ-yədās are just as 'regular' as forms of the shape of (e.g.) qʷəlʔ-qʷéle(h) 'cedar trees,' etc.

But what of forms such as wəqʷəb; qə-wəqʷab 'box,' in which, despite the occurrence of an initial 'resonant,' no glottal stop appears in the augment? qə-wəqʷab in fact demonstrates a most important constraint, viz., that when the final consonant in the reduplicating syllable is not voiced (i.e., is not b,d,m,n,l,w,y) no glottal stop appears in the augment. But we do not necessarily conclude that this is a constraint on the rules for generating glottal stops. From the evidence so far, we might just as plausibly assume that the glottal-stop is generated regularly, but that forms of the shape 'resonant'-V-unvoiced consonant fail to meet the conditions for glottal-attraction. That the glottal stop is thereafter absorbed and later lost is a hypothesis which we could so far fairly maintain.⁵

¹See Chap. II, sec. 17 for evidence that the root vowel itself is involved.

²Since many Salish languages (such as Snohomish) simply reduplicate CVC of the stem, without vowel-loss, it seems that Twana has added a rule here. The consequences of this rule are the subject of much of the rest of the present chapter.

³Chap. II, sec. 20.

⁴
$$\begin{matrix} C_1 & ? & C_2 \\ 1 & 2 & 3^2 \end{matrix} \longrightarrow 1 \ 3 \ 2 \text{ in env./ - \& } C_1 \acute{V} \text{ (with exceptions).}$$

⁵See the discussion, in a larger context in Chap. II, sec. 7 (Augment Clusters).

The forms typified by ʔasawáak^w ; ʔaslaʔ-wáak^w 'crazy,' and yašad ; ʔeʔyašad 'foot' in turn demonstrate that the glottal attraction rule applies equally to roots of the shape 'resonant'-V-continuant, although here again there are complications¹ to be commented on further.

For the complications arising with augmented forms based on roots of the shape C-V-semi-vowel (y,w), typical cases are $\text{k}^w\text{óy}$; $\text{k}^w\text{eʔ-k}^w\text{óy}$ 'mother' and láwalbaš ; ʔoʔ-láwalbaš 'Indian, person.' Assuming the hypothesis above, concerning the shape of reduplication, the augmented forms should be based on the shapes $*\text{k}^w\text{oy-k}^w\text{óy}$ and $*\text{láw-láwalbaš}$. We derive $\text{k}^w\text{ʔy-k}^w\text{óy}$, ʔw-láwalbaš (by loss of unstressed vowel in reduplication); then $\text{k}^w\text{yʔ-k}^w\text{óy}$, ʔwʔ-láwalbaš (by glottal metathesis).

Comparing these derived forms with the proper outputs above, we see that y and w have become e and o respectively, that is, 'semi-vowels vocalize when syllable-final in augment reduplication.' The environment 'between obstruents' is in fact sufficient for a formal rule, and is here obviously met. However, on the data so far presented, the environmental condition is met just as well before glottal metathesis ($\text{k}^w\text{ʔy-k}^w\text{óy}$) as after it ($\text{k}^w\text{yʔ-k}^w\text{óy}$).² Thus

Semi-Vowel Rule

$$\begin{array}{ccccc} \text{Obstruent} & \left\{ \begin{array}{c} y \\ w \end{array} \right\} & \text{Obstruent} & \longrightarrow & 1 \left\{ \begin{array}{c} e \\ o \end{array} \right\} 3 \\ 1 & 2 & 3 & & \end{array}$$

The form sčáʔyat ; sčeʔ-čáʔyat 'salmon-gill,' in turn exemplifies the already explained vocalization of semi-vowels, but it also requires a base form not identical in shape with the unaugmented form. If we take $*\text{sčáʔyat}$ as our base, we are forced to complicate what was a very simple formulation of the process of reduplication. Reduplicating CVC, we derive $*\text{s-čaʔ-čáʔyat}$,

¹In particular, the shwa in ʔoʔ-wáak^w arises through shwa-insertion while the e in ʔeʔyašad requires a special metathesis rule (Chap. II, sec. 7.4); both forms show cluster-simplification.

In qoʔ-qəʔ-wəče(h) 'canes,' the ʔ-attraction has operated on both augment and stem (cf. qəwəʔ-áče(h)); in addition the originally-stressed vowel is lost (see tri-syllabic stems, Chap. II, sec. 5); shwa is later inserted.

²We shall resolve this ordering problem, together with other problems of rule-ordering, when a suitable number of rules is available for the discussion (see Chap. II, sec. 9 end).

from which it is impossible to derive the correct augmented form without a completely ad hoc substitution of e for the reduplicating vowel a.

It is clearly preferable to assume that the base form is in fact *scáy¹at, and that the glottal attraction rule has operated to give scáy¹ya¹t: the augmented form is then perfectly regular, i.e., follows the rules we have so far discussed.

The following forms illustrate the same phenomenon, and are thus, similarly, supposed to derive from roots of the shapes indicated: s-có¹b; s-cáb-có¹b 'crab-apple' from *s-cób¹?; ʔaš-čó¹b; ʔaš-čab-čó¹b, 'jammed,' from *ʔaš-čób¹?; and dæ^w-lá¹w-bəd; dæ^w-ló¹-lá¹w-bəd 'baking pan,' from *dx^w-láv¹-bd.

One further anomaly exemplified in Figure 11(b) must be referred to. The loss of final glottal stop in wədáw¹?; wəd¹-wədáw cannot be explained on the basis of processes so far discovered; a possible explanation will be offered later, after we have considered the proper underlying features of dictionary b, d (see Chap. II, sec. 15.4, 'h-mutation').

II.4. Disyllabic Stems, Oxytone

<u>Unaugmented</u>		<u>Augmented</u>	<u>Gloss</u>
		<u>Noun</u>	
(a)	s-xpáb	s-xp ¹ -xpáb	cockle
	yesád	še ¹ -yěsad	foot
	cadé ¹	cad-cədə ¹	he
	tábéx ^w	təb-təbax ^w	land, earth
	s-yaláb	s-yal ¹ -yálab	year
	wələp	wəl ¹ -wəlap	you (bound, free)
	yədəs	yəd ¹ -yədas	tooth
	wəqáb	qə-wəqab	box
		<u>Verb</u>	
	ʔas-q ^w təx ^w	ʔas-q ¹ t-q ^w ətax ^w	thin
	ʔas-qəbác	ʔas-qəb-qəbac	shrunk
	ʔas-q ^w əlób	ʔas-q ¹ əl ^w əlab	sunk
	ʔas-cəl ¹ əs	ʔas-cəl ¹ -cə ¹ las	rattled
	ʔasa-wəlák ^w	ʔas- lə ¹ -wəlak ^w	crazy
		<u>Noun</u>	
(b)	š-čtáy	š-čt ¹ -čtáy	pan
		~ š-čt ¹ -čtáy	

Fig. 12.--Disyllabic Stems, Oxytone

Having treated a variety of stems from the point of view of the behavior of the different consonantisms in the reduplicating syllable, we turn now to the complications found in certain augmented forms, the underlying dictionary entries for which we shall hold are best considered to be di-syllabic roots of the shape CVCV̆

Consider the data in Fig. 12(a), where we present forms grouped together as showing similar behavior in the environment of the augment. These examples are not, however, identical in shape in the unaugmented form. Some are di-syllabic (e.g. s-yə́ləb 'year'), while others have the shape CCVC̆ (e.g., s-xpáb 'cockle'). We also note that the di-syllabic forms are stressed on the second syllable in the unaugmented form, but on the first in the augmented form (s-yə́ləb, but s-yə́lʔ-yə́lab).¹ What is more, whatever the stressed vowel in the unaugmented form, such shapes CVCVC̆ all exhibit the vowel a in the second (now unstressed) syllable when the augment is present² (s-yə́lʔ-yə́lab).

Comparing now the unaugmented forms of shape CCVC, we note that they too have the shape CVCV̆, as well as the same vowel-alternation, when the augment is present. Thus (e.g.) ʔəs-q̄^wɔx^w, but ʔəs-q̄^wt-q̄^wstax^w 'thin.'

We now have the motivation for assuming that the types represented by s-xpáb and s-yə́ləb are in fact of identical underlying shape, and shall represent both as disyllabic in their dictionary entries. Thus we avoid the need for special rules for the alternation CC ~ C̆C between unaugmented and augmented forms: a single rule deletes unstressed shwa between voiceless obstruents.

The question must, however, be raised; are all lexical morphemes (minimally) CVC in shape? In particular, do the very few forms exemplified by 'pan' (sub-corpus [b]) not in fact witness the existence of stems of underlying shape CCVC̆? Should this prove to be the case, then we must modify the Constituent Structure rule for Augmentative and explain the alternative s-čt-čstay as an analogical remodelling on the basis of the statistically predominant CVC root shape.

However, other factors must also be taken into account, and it will be held that the anomalous Augmented form for 'pan' shows stress-alternation rather than deviant root shape.³

There remains the problem of specifying the $\bar{v} \sim a$ alternation. Once stress-attraction⁴ is assumed to have operated in these augmented forms there

¹Cf. Chap. II, sec. 3.2.

²Compare s-teqéw; s-q-téqaw 'horse,' bə-cqél; 'he's going up' but ʔas-c̆qal 'up,' etc.

³See Chap. II, sec. 21.1, 'Stress Alternations.' ⁴Cf. Chap. II, sec. 3.2.

is no way to distinguish disyllabic stems with original second-syllable stress, from similar stems with original first-syllable stress (e.g., *yǝdés*; **yǝdʔyǝdes*; *sǝbáded*; *sǝbǝd báded*). Thus, from the unaugmented form alone there is no way of knowing to which forms the *a*-producing rule must apply. The *a*-rule might be applied before the stress-retraction rule, a recourse which would certainly ensure the correct forms; but in an important sense such a solution is to be regarded as an illegitimate device, for it runs counter to the intuition that the vowel alternation is a result of the shift in stress; we assume, that is, that an originally-stressed vowel does not retain the feature [-compact] when it ceases to carry primary stress.

We thus prefer the equally simple, but more satisfying assumption that the re-assignment of stress to the first syllable does not wipe out the original stress but merely reduces it to secondary stress.¹ The positive condition for the *a*-rule is thus 'in a syllable carrying secondary stress.'

The two processes just described may be illustrated from another part of Twana morphology. Consider the following examples of transitive verb forms, each form consisting of a stem plus first person singular -*čǝd*.

Examples

<u>Unaugmented</u>	<u>Augmented</u> ²	<u>Gloss</u>
teč-é-čǝd	teč-a-čǝd	I scatter
teq ^w -éčǝd	teq ^w -a-čǝd	I play with
čel-é-čǝd	čel-a-čǝd	I hang up
k ^w aš-á-čǝd	k ^w aš-a-čǝd	I cut
x ^w ac-áčǝd	x ^w ac-a-čǝd	I lift up
páč-á-čǝd	páč-a-čǝd	I sew
q ^w o ^w -ó-čǝd	q ^w o ^w -a-čǝd	I hide
po ^w k ^w -ó-čǝd	po ^w k ^w -a-čǝd	I raise (bread)
toq ^w -ó-čǝd	toq ^w -a-čǝd	I find
k ^w š-ǝ-čǝd	k ^w š-a-čǝd	I count
tk ^w -ǝ-čǝd	tk ^w -a-čǝd	I pierce
sč-ǝ-čǝd	sč-a-čǝd	I split
ləq-ǝ-čǝd	ləq-a-čǝd	I buy, get

It will be seen that each stem in the Corpus consists of a CVC root plus stem-formative vowel, and that the stem-formative is either identical with the root vowel or (for the last four forms) corresponds to a zero-vocalism in the root.

Now it is clear that the latter cases are in fact quite 'regular,' behaving

¹ A weaker claim might be simply that stress-shift is accompanied by vowel-ablaut. But see Chap. II, sec. 21, for further justification of the position taken here.

² It is entirely possible that we have to do with aspect here, as well as (or, instead of?) plurality (compare p. 36, fn. 2).

in precisely the same way as the forms of Figure 12(a) (Chap. II, sec.4) of (un-augmented) shape CCVC, such as s-xpáb; s-xp-xpáb 'cockle.' We thus reconstruct the underlying forms here as (e.g.) *k^wás 'count,' *tók^w 'pierce,' *səq 'split,' and *lɔq 'buy, get,' noting that the vocalism in ləq-ə-čəd must be considered a full vowel, parallel to those in the first nine forms of the corpus, and not a glide-vowel in an incompatible cluster resulting from the loss of a stressless ə in a root (compare s-xpáb).¹

The content of the unaugmented transitive-stem-formative vowel may thus be defined as a 'copy of the stem vowel.' The question now arises as to what is the proper status of the a-vowel which appears invariably in the second syllable of these augmented forms. We might choose to assert that the augment involves the addition of a vocalism (or even a consonantism), in conjunction with which the stem-formative vowel gives a. However, there seems no cogent reason for not assuming, quite simply, that 'augment' in a transitive Verb Phrase is to be understood as 'retract the stress to the root syllable': the replacement for the originally-stressed vowel has then the status of the parallel vowel in the disyllabic second-syllable-stressed Noun and Stative verb, i.e., it is an automatic result of the re-assignment of primary stress, and has for its environment 'vowel under secondary stress.'

Thus: Rule 1. Definition of Constituent Structure for Augment.

Rule 2. Stress assignment--stress initial syllable of stem, in Augment

Rule 3. Ablaut rule---vowel under secondary stress → a.

II.5 Trisyllabic Stems, Paroxytone

We now illustrate the behavior of tri-syllabic stems stressed on the second syllable in the unaugmented form.

Once more, it is clear that the stress retracts to the first syllable in the environment of the augment. Consider (Fig. 13[a]) q^wəláde(h); q^wəlɔq^wəláde(h) 'ear.' Secondly, as with di-syllabic stems (compare Fig. 12[a], Chap. II, sec.4) we must consider initial CC to derive from an underlying CəC, as in forms such as k^wtábac; k^wtk^wstəbəc 'husband,' for which we postulate an underlying *k^wətábac.³

As distinct from the disyllabic forms of Figure 12, however, the tri-syllabic forms now under discussion lose an originally-stressed vowel when this vowel ceases to bear primary stress in the environment of the augment. However,

¹ Compare the argument on s-xpáb, in Chap. II, sec. 4, above.

² Cf. Kincaid (1966), pp. 343-348 for vowel ablaut (involving shwa - a) in Upper Chehalis.

³ And similarly, therefore, *s-təqáxəd 'arm,' *təkáyas 'basket,' and *čəx^wálas 'steam.'

despite the juxtaposition of voiced consonantisms resulting in some cases, no glide vowel appears: we get $\dot{q}^w\text{ə}1^? \dot{q}^w\text{ə}1\text{de}(\text{h})$, not $^{**}\dot{q}^w\text{ə}1^? \dot{q}^w\text{ə}1\text{ə}1\text{de}(\text{h})$.

	<u>Unaugmented</u>	<u>Augmented</u>	<u>Gloss</u>
		<u>Noun</u>	
(a)	$\dot{q}^w\text{ə}1\text{ə}1\text{de}(\text{h})$	$\dot{q}^w\text{ə}1^? \dot{q}^w\text{ə}1\text{de}(\text{h})$	ear
	$k^w\text{tā}b\text{ac}$	$k^w\text{t}-k^w\text{ə}1\text{ə}1\text{b}\text{ac}$	husband ¹
	$s-\text{t}\dot{q}^w\text{ə}1\text{ad}$	$s-\dot{q}^w-\text{t}\dot{q}^w\text{ə}1\text{ad}$	arm
	$s-\text{s}\dot{q}^w\text{ə}1\text{ce}(\text{h})$	$s-\dot{q}^w-\text{s}\dot{q}^w\text{ə}1\text{ce}(\text{h})$	finger
	$\dot{q}^w\text{ə}1\text{ə}1\text{ce}(\text{h})$	$\dot{q}^w\text{ə}1^? \dot{q}^w\text{ə}1\text{ce}(\text{h})$	cane, walking-stick
	$\text{tkā}y\text{as}$	$k-\text{t}\dot{q}^w\text{ə}1\text{ke}^? \text{as}$	basket ²
	$s-\text{t}\dot{q}^w\text{ə}1\text{qs}$	$s-\dot{q}^w-\text{t}\dot{q}^w\text{ə}1\text{qs}$	nostril
		<u>Verb</u>	
	$\text{ʔas}-y\dot{q}^w\text{ə}1\text{ce}(\text{h})$	$\text{ʔas}-\dot{q}^w\text{ə}1\text{ce}^? \text{ce}(\text{h})$	washed hand
	$\text{ʔas}-\text{c}\dot{x}^w\text{ā}l\text{as}$	$\text{ʔas}-x^w-\text{c}\dot{x}^w\text{ə}1\text{as}$	steamed
	$\text{ʔas}-w\dot{q}^w\text{ə}1\text{c}\text{ə}d\text{ə}x^w$	$\text{ʔas}-\dot{q}^w-\text{w}\dot{q}^w\text{ə}1\text{c}\text{ə}d\text{ə}x^w$	open
	$\text{ʔas}-\text{t}\dot{q}^w\text{ə}1\text{cad}$	$\text{ʔas}-q-\text{t}\dot{q}^w\text{ə}1\text{cad}$	closed
	$\text{ʔas}-p\dot{q}^w\text{ə}1\text{eq}^w\text{ad}$	$\text{ʔas}-p\dot{q}^w-\text{p}\dot{q}^w\text{ə}1\text{eq}^w\text{ad}$	feather in the hair
(b)	$b\dot{q}^w\text{ə}1\text{qs}\text{əd}$	$q\text{ə}-b\dot{q}^w\text{ə}1\text{qs}\text{əd}$	nose
(c)	$s\dot{q}^w\text{ə}1\text{h}\text{ap}$	$s-\dot{q}^w-\text{s}\dot{q}^w\text{ə}1\text{h}\text{ap}$	tree-trunk

Fig. 13.--Trisyllabic Stems, Paroxytone

¹ $k^w\text{t}-k^w\text{ə}1\text{ə}1\text{b}\text{ac}$ also occurs: but since no other example of such a $C \sim \dot{C}$ alternation is found, we must tentatively consider the alternation to be governed by dictionary marking (optional).

²The form $k-\text{t}\dot{q}^w\text{ə}1\text{ke}^? \text{as}$ 'baskets' shows a 'secondary,' post-tonic glottal stop within the stem. We reserve discussion of such occurrences of glottal stop for the treatment of the Attenuative. There, the stressing of the prefix, with consequent vowel-losses in the stem, ensures a usefully large mass of data with which to supplement the sporadic and unsystematic cases to be found in the corpus of augmented Noun stems.

On the other hand, a comparison of the augmented forms for 'husband,' 'arm,' and 'nostril' strongly suggests that the -vowels appearing in post-tonic syllables are to be considered as inserted glide-vowels, and not weakened forms of full vowels.¹

¹Compare shwa-insertion in the reduplicating syllable (Chap. II, sec. 3.3).

The implication is clear: for tri-syllabic stems, we must consider both post-tonic vowels to have been lost in the augmented forms. But what of 'ear,' 'finger,' 'cane' and 'washed hand,' in the augment of which a final vocalism remains, apparently counter to the above formulation?

We first note that all these forms show the alternation 'final h ~ zero.' Since, as we shall show,¹ final h is optionally lost after an unstressed vowel, these forms must then possess final h underlyingly. The surviving vowels must then be attributed to a limitation on the vowel-loss rule;² that rule must be supplemented by 'but not a final vowel before h.'

The augmented 'ears' has the further interest for us that no glide-shwa is inserted ($\dot{q}^w\dot{a}l^w - \dot{q}^w\dot{a}ldeh$), our first hint that a distinction must be made between compatible and incompatible resonant clusters.³

We are now, incidentally (sub-corpus [b]), able to explain the apparent failure of the $\dot{V} \rightarrow a$ rule to operate for the case of $\dot{b}a\dot{q}s\dot{a}d$; $\dot{q}ab\dot{e}q\dot{s}ad$ 'nose,'⁴ where we expected the augment to give $**\dot{q}ab\dot{e}q\dot{s}ad$. If we assume that 'nose' is underlyingly not disyllabic but trisyllabic ($*\dot{b}a\dot{q}s\dot{a}d$), then stress-retraction gives $\dot{b}a\dot{q} - \dot{b}\dot{e}q\dot{s}ad$, and the $\dot{V} \rightarrow a$ rule gives $\dot{b}a\dot{q} - \dot{b}\dot{e}q\dot{s}ad$ quite regularly; but, of course, both post-tonic vowels will be lost ($\dot{b}q - \dot{b}\dot{e}q\dot{s}d$), the initial cluster will be simplified ($\dot{q} - \dot{b}\dot{e}q\dot{s}d$), and the output will gain shwas by later insertion--thus $\dot{q}ab\dot{e}q\dot{s}ad$.

But there is an apparent contradiction to the above formulation: if $\dot{b}a\dot{q}s\dot{a}d$ is from $*\dot{b}a\dot{q}s\dot{a}d$, then $\dot{s}l\dot{q}^w\dot{e}q\dot{s}$ 'nostril' must be from $*s - l\dot{a}\dot{q}^w\dot{e}q\dot{s}$. But in that case, why is the final vowel lost in the output form $\dot{s}l\dot{q}^w\dot{e}q\dot{s}$? Although the corpus for this phenomenon is slender, it will be suggested⁵

¹See Chap. II, sec. 15. The rule of course applies to all the forms of the corpora showing final (h).

²Note that it is not feasible to re-interpret these final \dot{e} vowels (e.g.) as derived from underlying semi-vowels (y); a form such as (augmented) $s - \dot{q} - \dot{s}\dot{a}\dot{q}a\dot{c}y\dot{h}$ would then irregularly retain its middle vowel, giving $**\dot{q} - \dot{s}\dot{a}\dot{q}a\dot{c}y\dot{h}$, thence $**\dot{q}s\dot{a}\dot{q}a\dot{c}eh$.

³A distinction that will, of course, be reflected in the rule for shwa-insertion (see Chap. II, sec. 20).

⁴Cf. Chap. II, sec. 3.2.

⁵The evidence for this analysis must come from the Attenuative (see Chap. III).

that a final shwa in paroxytone disyllables is lost between voiceless consonants.

The augmented form for 'tree-trunk' again raises the question of CC-stems, referred to above (Chap. II, sec. 4, disyllabic stems).

Again (Chap. II, sec. 2.1, Irregular stress) the discussion must be postponed.

II.6. Rule Summary 1

For convenience, we shall here briefly and informally summarize the rules we have stated or implied so far, with an indication of their ordering insofar as this is as yet clarified in the text. For the moment, we constrain all these rules to 'augmented' forms.

1. 'Augment' (for non h/?-initial stems) consists of $C_1V_1C_2$ reduplication, unstressed.
- Before 3 2. In the environment of the augment, stress retracts to the stem-initial syllable. Stress on an originally-stressed non-initial syllable in the stem falls to secondary stress.
- After 2 3. A vowel under secondary stress changes to a.
- Before 5 4. An unstressed vowel in a reduplicating syllable gives h which is replaced by glottal-stop if either of the consonants of that syllable is a resonant.
- After 4, before 9 5. An unstressed vowel (but not a semi-vowel) is lost in the following conditions:
 - (i) in the reduplicating syllable.
 - (ii) a shwa in the first syllable of the stem.
 - (iii) post-tonic vowels in closed syllables, in tri-syllabic stems.
- After 4, before 7 6. Glottal stop is attracted to the stress across a consonant which is voiced or continuant.
- After 4, before 9 7. A semi-vowel vocalizes between consonants.
8. A glottal stop is absorbed by an adjacent resonant.
- After 6-8, before 10 9. Some tri-consonantal clusters arising in reduplication lose the first element.
10. Shwa-insertion; except for certain morpheme-internal 'compatible' clusters.

II.7. Augment Clusters

II.7.1. General

So far, the augment reduplication¹ has been characterized as consisting of a $C_1V_1C_2$ copy of the stem-initial syllable. However, Figure 14 consists

¹For stems with other than h- or glottal stop as C_1 or C_2 .

<u>Unaugmented</u>	<u>Augmented</u>	<u>Gloss</u>
(a)	<u>Noun</u>	
s-táq	s-q-táq	log jam
čáqpe(h)	q-čáqpe(h)	fir tree
s-lá ^w áqs	s-q-lá ^w áqs	nostril
s-ckábsəd	s-k-čákabšəd	shin
tRápšəd	k ^w -tá ^w kápšəd	shoe
sáx ^w təd	x ^w -sáx ^w təd	grease, fat
	<u>Verb</u>	
ʔas-čéq	ʔas-q-čéq	red
ʔas-šáq ^w	ʔas-q ^w -šáq ^w	smeared
ʔas-láq ^w	ʔas-q ^w -láq ^w	extinguished
ʔas-tá ^w k	ʔas-k ^w -tá ^w k	pierced
ʔas-céx ^w	ʔas-x ^w -céx ^w	boiled
(b)	<u>Noun</u>	
čáp	p-čáp	aunt
sáp ^w təd	p-sáp ^w təd	stick
	<u>Verb</u>	
ʔas-čáp	ʔas-p-čáp	flooded
ʔas-láp	ʔas-p-láp	hung over and down
(c)	<u>Noun</u>	
s-páq ^w	s-pq-páq ^w	feather
k ^w ábə ^w lax ^w	<div> <div>k^wəb-k^wábə^wlax^w</div> <div>~ k^wp-k^wábə^wlax^w</div> </div>	root
ʔas-páq	ʔas-pq-páq	white
ʔas-k ^w áp	ʔas-k ^w p-k ^w áp	correct, straight
təbəx ^w	təb-təbax ^w	land, earth
ʔas-ləb	ʔas-ləb-ləb	scarred
bəqsəd	qə-bəqsəd	nose
(d)	<u>Noun</u>	
bəqsəd	qə-bəqsəd	nose
ʔas-bót	ʔas-lə-bót	suckled
ʔas-mə ^ʔ	ʔas-ʔə-mə ^ʔ	proud
ʔasə-déc ^ʔ	ʔə-čə-déc ^ʔ	grazed, scratched

	Unaugmented	Augmented	Gloss
	ʔasa-waia ^w	ʔas-iʔ-waia ^w	crazy
	ʔas-lax	ʔas-xalʔax	lit, bright
(e)	yášqšče	še ^ʔ yášqšče	long finger
	yaššad	še ^ʔ yaššad	foot
	ʔas-yax ^w	ʔas-x ^w eʔ-yax ^w	disappeared
	ʔas-yax	ʔas-xeʔ-yax	sorted
	ʔas-yáq	ʔas-qe-yáq	filed
(f)	ʔas-x ^w ót	ʔas-t-x ^w ót	soaked
	ʔas-x ^w ecós	ʔas-c-x ^w ecás	fighting
	ʔas-x ^w ác	ʔas-c-x ^w ác	lifted up
	ʔas-xác	ʔas-č-xác	measured
	ʔas-xót	ʔas-t-xót	flicked
	ʔas-xáq	ʔas-q-xáq	landed
(g)	čáš	š-čáš	elder sister
	ščá ^ʔ esad	ščá ^ʔ -ča ^ʔ esad	eyebrow ¹
	ʔasqácxad	ʔasqá-qácxad	short arm ²
	k ^w opéc	k ^w -k ^w ópac	master
	sq ^w ópčalʔaš	sq ^w ó-q ^w ápčalʔaš } ~ sq ^w o-q ^w ápčalʔaš }	cane, stick ³

Fig. 14.--Augment Clusters

¹čáč 'be across' ; -áyas pronominal eye ; -Vd derived Nom.

²qác 'short' ; -áxad pronominal 'arm.'

³s- Nominal ; q^wóp 'root' ; čVlVs ; connected with čálaš 'hand' ?
For anomalous stressing in Augment, see Chap. II, sec. 21.

of forms which, at first sight, appear to contradict that formulation. Beside čát ; čt-čat 'elder brother,' ʔas-R^wáp ; ʔas-R^wp-R^wáp 'corrected' (as in Fig. 9), there are also s-təq ; s-q-təq 'log jam,' yaššad ; še^ʔ-yaššad 'foot,' etc.

One simple way to handle the difference between the forms of Figures 9 and (present) 14 might be to assert that, quite simply, another type of re-

duplication is here involved, a type then characterized as follows:¹ 'the augment may consist of initial repetition of the terminal consonant of the stem syllable.'² We might then conceive of the relevant dictionary-entries as including the rule-feature³ [reduplication type 2] (or some other similar notation), in conjunction with a minor rule⁴ in the grammar.

On the other hand, it would clearly be preferable to treat these forms, not as subject to another ('minor') reduplication rule, still less as individual exceptions to the $C_1V_1C_2$ rule, but rather as behaving differently because of their phonological shape. It will be shown that the reduplicating syllable of these forms simply loses its initial consonant, and that this loss results quite straightforwardly from the constraints on clusters. The clusters in question arise regularly through the loss of the vowel in an unstressed reduplicating syllable, for the root-consonant pairings to be defined below.

II.7.2. Clusters with Velar as C_2

We now consider the forms of Figure 14, on which we shall base our account of the constraints on augment clusters, referring also to forms of earlier corpora in an attempt to distinguish between non-permissible clusters and those merely non-occurring.

In forms Figure 14(a), note that if the second element of the cluster is a velar⁵ stop or spirant (whether or not labialized and/or glottalized), then the first element is lost. Forms (b) suggest that it is [-grave] first

¹Thus Edel (1939), par. 23. Cf. Haeblerlin (1917), passim.

²Better, for our purposes, 'stem-initial syllable.'

³See Lakoff (1965) for the question of linguistic irregularity in general, and the use of 'rule-features' in particular.

⁴The distinction between 'major' and 'minor' rule, important in Lakoff's formulation, is still fraught with difficulties, especially insofar as (as in the present case) it is based on essentially statistical considerations.

⁵The corpus is deficient in forms containing k, but there is no evidence to suggest the need to distinguish between [+Retracted] (i.e., q-type) and [-Retracted] (i.e., k-type) velars, from the point of view of the present rule. The absence of k-forms is here to be considered 'accidental.'

elements that are lost before [+grave] second elements, and that the 'environment' must not be confined to $\begin{bmatrix} +\text{grave} \\ -\text{diffuse} \end{bmatrix}$ consonants (viz., velars).

Forms (c) confirm that the left-hand side of the cluster-simplification rule must specify [-grave] consonants.

The rule now takes the following tentative shape:

Rule I: $\begin{bmatrix} +\text{cons} \\ -\text{grave} \end{bmatrix} \rightarrow \emptyset$ in env. $\begin{bmatrix} +\text{cons} \\ +\text{grave} \end{bmatrix}$ & Aug.redup.

This formalizes the generalization that in the unique cluster-type C_1C_2 & C_1 - found in augmented forms, the sequence [-grave] [+grave] [-grave] constitutes an incompatible cluster,¹ to be resolved by deletion of the first member.

A further constraint is dictated by forms (c) of the type təb^w ; təb-təb^w 'land,' and ʔas-təb ; ʔas-təb-təb 'scarred.' Comparing such forms with ʔas-təp ; ʔas-pətəp 'hung over & down' of forms (b), note that a [-grave] segment is lost before p ,² but not before b , although both p and b are both [+grave] segments. For the moment we formalize this distinction in simple and obvious fashion by adding [-voice] to the specification of the 'environment' of Rule I above. For convenience, we now re-write Rule I, as follows:

$\begin{bmatrix} +\text{cons} \\ -\text{grave} \end{bmatrix} \longrightarrow \emptyset$ in env. $\begin{bmatrix} +\text{cons} \\ +\text{grave} \\ -\text{voice} \end{bmatrix}$ Aug.redup.

In the same sub-corpus, on the other hand, note that while initial p is retained in s-pq^w - pəq^w 'feathers,' initial b is lost in qə-bəqsəd 'noses.'

For qə-bəqsəd , etc., however, it is not feasible to amend Rule I to make it operate at all, for we have already been forced to specify the left-hand part as referring to segments [-grave]. We must apparently add a sub-rule to Rule I to deal with the anomaly.³

¹The rules for cluster-simplification in augment could, perhaps more powerfully, be framed in terms of tri-segmental strings, but it is for the moment not certain that identical strings could not arise elsewhere in Twana than in augment reduplication. We have thus chosen, at least temporarily, to limit the rule to Augment.

²The distinction is a priori implausibly assignable to the glottalization of p in təp 'hang down.' This is confirmed by the existence of forms such as čáp ; p-čáp 'aunt.'

³We might add to the left-hand side of Rule I the following:
 $\begin{bmatrix} +\text{cons} \\ +\text{grave} \\ +\text{voice} \end{bmatrix}$, to allow b-loss (bəqsəd ; qə-bəqsəd) but not p-loss (pq^w - pəq^w).

II.7.3. Clusters with Voiced Consonant as C_1

However, consider the forms of sub-corpus (d). $bót$; $tá-bót$ 'suckled' (etc.) is a member of a class in which the initial consonants are [+voice] and the following ones are [-voice]; the constraint then, is really on the total sequence [+voice] [-voice] & [+voice]¹ in augment, and the first element is lost. This being the case, the addition of a sub-rule to Rule I, in order to allow it to handle $qə-báqsəd$ as part of the natural class of clusters having a [+grave] second element, would not only be superfluous but would also lack the explanatory power of the analysis now proposed.²

Rule II thus reads:

$\begin{bmatrix} +cons \\ +voice \end{bmatrix} \longrightarrow \phi$ in env. / - $\begin{bmatrix} +cons \\ -voice \end{bmatrix}$)Aug. redup.

II.7.4. Clusters with Y Plus Voiceless Consonant

Figure 14(e) presents another kind of problem. If we assume that these forms follow Rule II above, we apparently explain why the initial y disappears. Let us reconstruct this stage, for the augmented $*yáś-yáśad$ 'feet,' and compare the identical stage for the parallel form $*wáɫ-wáɫak^w$ 'crazy.'

Both forms are of the shape Resonant-V-Continuant, so we expect:

$yáś-yáśad$, $yáś^?-yáśad$, $ś^?-yáśad$, $śá^?-yáśad$
 $wáɫ-wáɫak^w$, $wáɫ^?-wáɫak^w$, $ɫ^?-wáɫak^w$, $ɫá^?-wáɫak^w$ ³

operating the rules for $V \rightarrow h$, $h \rightarrow ?$, glottal-metathesis, cluster-simplification, and shwa-insertion.

However, whereas $ɫá^?-wáɫak^w$ is the correct (and only) augmented form of $wáɫak^w$, $śá^?-yáśad$ is one of three alternative outputs for the augmented form of $yáśad$. How do the other two augmented forms of $yáśad$ arise? We take first the alternative $śe^?-yáśad$, then $še^?-áśad$.

Recall forms such as $k^wóy$; $k^we^?-k^wóy$ 'bend' (Fig. 11[b] , Chap. II, sec. 3.3). We note that the e -vocalism in $še^?-yáśad$ is in the proper environ-

¹ Compare (Fig. 10, Chap. III, sec. 3.2) $sə-bəd-báded$ 'mountains,' $yəd^?-yádas$ 'teeth,' for the underlying sequence [+voice] [+voice] & [+voice].)Aug. redup.

² For the same reason, these rules must be ordered so that present Rule II precedes original Rule I.

³ Note the shwa-insertion in env./#C-?. Cf. Chap. II, sec. 17.2.

ment (viz., C-C) for the vocalization of a semi-vowel, in the present case *y*. Supposing this as a possibility, what is the source of the *y* in the (reconstructed) form *šyʔ-yǎśad ? The most plausible explanation we can offer is that metathesis of original *yš* has occurred. A Y-metathesis rule,¹ operating after glottal-metathesis, will permute the segments Y + voiceless consonant, the derivation being as follows:

yǎś-yǎśad	by Constituent Structure
yǎś-yǎśad	by stress-assignment
yǎś-yǎśad	by $\dot{V} \sim$ a mutation
yǎś-yǎśad	by $V \rightarrow h$ (loss of voice and position)
yʔś-yǎśad	by $h \rightarrow ?$
yšʔ-yǎśad	by ? - metathesis
šyʔ-yǎśad	by <u>Y</u> - metathesis (optional) (Compare yšʔ-yǎśad above)
šeʔ-yǎśad	by vocalization of semi-vowels

What then of the alternatives of the shape šeʔ-ǎśad ? To understand these forms it is necessary to revert to the ?-metathesis rule. As tentatively formulated (see Chap. II, sec. 3.3), it permutes the ? with the next segment towards the stress. The present cases seem to constitute evidence that the metathesis may occur across more than a single segment, as far as the stressed vocalism.² The derivation of the output forms, taken from the stage at which a two-segment ?-metathesis can occur, is as follows:

yʔś-yǎśad	
yš-yʔǎśad	by ?-metathesis (2-segment option)
šy-yʔǎśad	by Y-metathesis : <u>non</u> -application gives yš-yʔǎśad
še-yʔǎśad	by vocalization of semi-vowels. Also yš-eʔǎśad
<u>remains</u>	by cluster-resolution. Also š-eʔǎśad

Note that there are theoretically four, not three possible outputs for the rules given above, since we must allow for both one and two-segment metathesis of ?, and also the application or non-application of the Y-metathesis rule. In the case of the two-segment ?-metathesis, application and

¹Not 'semi-vowel metathesis,' for the output *iaʔ-wǎlak^w* requires no previous stage ***iʔwʔ-wǎlak^w*, and thus no *w-i* metathesis. For the appropriate features for *y* in this rule, see Chap. II, sec. 7.5, end.

²There are even one or two cases of metathesis across the stressed vocalism itself: but I do not have sufficient structured material to do more than note this for further study.

non-application of Y-metathesis are seen to give identical phonetic outputs, for there is no perceptual distinction between sey¹- and še²-.

Most of the forms of Figure 14(e) may be explained by the same rules. However, forms such as ʔas-yə́q; ʔas-qe-yə́q, which present no glottal stop in the augmented form, may not be thus explained. Reconstructing, we assume that the underlying form for the augment is *ʔas-yə́q-yə́q. This should give **as-y^ʔq-yə́q. The glottal-attraction rule here failing to operate, it is obvious that y^ʔ-q cannot metathesise unless we introduce a further rule to delete the ʔ segment.

Consider the alternatives. The addition of a further rule to delete the unwanted glottal stop would guarantee the correct output; but the lack of any further need for such a rule at least warns us to seek another solution. Suppose, instead, we constrain the generation of the glottal stop.¹ This may be done at either of the two stages V to h, or h to ʔ. We may assert that the unstressed V gives zero (i.e., no h) if a voiceless stop follows; or, that h is produced but is lost before (or instead of) becoming glottal stop.

Since, as will be shown,² Twana h is lost in environments which include that of the present case, it is clearly preferable to adopt the latter solution.³ The rules involved are thus:

1. V to h in unstressed syll of Augment.
2. h --> Ø with following voiceless stop.
3. h to glottal stop, abutting a voiced consonant.
4. Glottal metathesis

II.7.5. Clusters with Velar Spirant Plus Oral Consonant

The remaining sub-corpus, Figure 14(f), makes it clear that in constraining the specification of the left hand side of Rule I to [-grave], we robbed that rule of the power to handle cluster-simplifications of the types

¹Cf. p. 45. Although forms such as wəqə́b; qə-wəqə́b could in fact be subsumed under a glottal-absorption rule (see p. 45), it simplifies the glottal-stop generating rules to allow the constraint to apply there too.

²See Chap. II, sec. 15.

³The important generalizations thereby preserved are (1) that unstressed vowels are always unvoiced and give h in Twana, and (2) that h gives glottal stop, adjacent to a voiced consonant.

bəqsəd ; qə-bəqsəd 'nose' (cp. pə^w-pə^w 'spotted'),
 x^wót ; t-x^wót 'soaked' (cp. x^wəd-x^wəd 'tired'), and
 xə́q ; q-xə́q 'landed' (cp. xp-xə́pab 'cockles').

It was shown above (Chap. II, sec. 7.3) that the type qə-bəqsəd 'noses' falls under the domain of the constraint on sequences [+voice] [-voice] & [+voice]. What is the relevant constraint in the remaining types (e.g., x^wót, xə́q) ?

The element deleted is clearly [+grave, +continuant].¹ The environment, however, constitutes a disjunctive set of features. For xə́q ; q-xə́q 'raked,' we require the environment to be [+grave] (q), yet non-diffuse² (since xp-xə́pab 'cockles,' does not lose its x in reduplication). On the other hand, the remaining cases are all subsumed most easily under the features minus grave, and [-voice]: the feature [-voice] is required, to exclude x^wəd-x^wəd 'tired,' etc. (i.e., second elements b,d,l,w,y, before which x^w is not lost). We thus formulate the following rule:

Rule III:

$$\begin{bmatrix} +\text{cons} \\ +\text{grave} \\ +\text{cont} \end{bmatrix} \longrightarrow \emptyset \quad \text{in env} / - \left\{ \begin{bmatrix} +\text{cons} \\ +\text{grave} \\ -\text{diff} \end{bmatrix} \right\} \quad (\text{for type } xə́q)$$

$$\left\{ \begin{bmatrix} +\text{cons} \\ -\text{grave} \\ -\text{voice} \end{bmatrix} \right\} \quad (\text{for type } x^w\acute{o}t)$$

)Aug. redup.

Throughout the present chapter, we have been concerned to show, whether explicitly or by implication, the explanatory power inherent in the use of distinctive features. However, far from exemplifying this, the above rule is in a sense far less revealing than the simple statement 'A velar spirant is lost before any voiceless consonant except p.' This simple environmental condition cannot be expressed in the features we have been using, for the feature of gravity required would also exclude loss of x before (e.g.) -q, as in xə́q ; q-xə́q 'raked,' giving **xə́q-xə́q.

On the other hand, the statement 'except p' merely gives us the bald

¹ A Twana segment marked [+grave] and [+cont] cannot also be [+glottal].

² [-voice] is not required for such cases, for no [-diffuse] segment can also be [+voice].

fact of the exclusion, as if this were a quite arbitrary exception¹ in the language, a conclusion we are loath to accept without further examination. We should prefer some positive manner of expressing the exclusion, while at the same time implicitly suggesting a reason for it.

What is wrong, from our point of view, is that there is no one feature which sets *p* apart from all other obstruents. This we propose to remedy by assuming the existence of just such a feature. Since all other obstruents are articulated within the oral cavity, let us call this feature 'intra-oral,' or more simply 'oral.'² The segment *p* is now uniquely specified as [+cons, -oral, -voice].

Rule III thus reads:

$$\begin{bmatrix} +\text{cons} \\ +\text{grave} \\ +\text{cont} \end{bmatrix} \longrightarrow \emptyset \quad \text{in env.} \quad / \quad - \begin{bmatrix} +\text{cons} \\ +\text{oral} \\ -\text{voice} \end{bmatrix} \quad \text{)Aug. redup.}$$

The theoretical status of the arguments in favor of the employment of a new feature, 'oral,' in the above rule, may reasonably be said to outweigh the fact that there may be no other use for this feature in the description of Twana.³

The cluster-resolution rule thus reads:⁴

$$\begin{array}{ccc} \begin{bmatrix} +\text{cons} \\ [1] \end{bmatrix} & \begin{bmatrix} +\text{cons} \\ -\text{voice} \\ [2] \end{bmatrix} & \longrightarrow \quad [\emptyset] \quad [2] \\ & & \text{Conditions: } \left\{ \begin{array}{l} [1] \text{ is } [+voice] \\ [1] \text{ is } [-grave], [2] \text{ is } [+grave] \\ [1] \text{ is } [+grave], [2] \text{ is } [-labial] \end{array} \right\} \end{array}$$

¹ Cf. the argument on *d* (but not *t*) loss, Chap. II, sec. 8.

² Better, perhaps, 'labial'--which I use in the rule.

³ That only *Y* is metathesized (and not *w* too) is perhaps made more plausible if we hold that only the [+oral] (or [-labial]) semi-vowel is involved (Chap. II, sec. 7.4). Cf. also *n*-loss (Chap. II, sec. 19, esp. end).

It is not without interest to note that the loss of the component of labiality from all obstruents in Tillamook (Edel 1939) may perhaps be understood as simply an exclusion of the same feature. This suggests the borrowing of a single rule from Lower Chinook, the neighboring language, also lacking the feature. On the other hand, Thompson (1966) states that Garibaldi Tillamook does possess labio-velars, although utilizing a special kind of rounding. See Chap. IV, sec. 6. See also Hamp (1967).

⁴ The extraction of 'conditions on rules' here allows the clearest formulation; in particular, the constraint in segment [2] on voicing.

II.7.6. Residual Forms, and s- Assimilation

Figure 14(g) contains five forms which, it seems, must be marked in the dictionary for anomalous cluster-simplification.

'Elder sister,' 'eyebrow': there are too few forms with clusters of this shape for us to be clear, but it is possible that there is a regular constraint, viz., against sequences of affricates.

Whereas 'master' must be assumed to have lost its reduplicating vowel regularly, 'cane' suggests the operation of a 'minor' deletion rule for C_2 of the reduplication when anomalously stressed.

It remains to note that Figure 14 presents several examples of the assimilation of s- (of prefix ʔas-) to a following $\text{ʃ}/\text{č}$. Of especial interest are those forms, such as ʔasadéč ; ʔəščadéč , 'grazed,' showing the assimilation only after the simplification of a cluster, and thus, of course, partly ordering the required rule for s-assimilation.¹

II.8. Representation of b,d

Before attempting to specify the underlying representations required to handle the limitations on glottalization in the augment, we survey the classes of consonants involved.

For cluster-resolution, it is recalled, we employed the feature of [voice] to distinguish l,w,y,b,d,ʒ,ʃ,g,g^w,m, and n from the rest of the Twana consonants. Here, on the other hand, we must distinguish l,w,y, from the rest of this set. The simplest distinction to be made is to characterize l,w,y as [-obstruent], leaving b,d,ʒ,ʃ,g, and g^w as [+obstruent, +voice], and m,n as [+nasal].

But the distinction we have newly made between voiced obstruents (b,d) and nasals (m,n) requires a more searching examination. Consider the corpora of Chapter IV, sec. 3.7,² from which we draw the following observations.

¹Since forms like *ʔas-sótčəd , 'I know it,' and *ʔas-šéc , 'paid' are commonly reduced to $[\text{ʔasótčəd}]$, $[\text{ʔašéc}]$, s-assimilation precedes (optional) geminate resolution. For the moment, we place both these rules after cluster-simplification (see Chap. II, sec. 9). See Chap. IV, secs. 3.2 and 3.4 for the shape of the rule for s-assimilation.

²Loan words and allophony are both discussed in full in Chap. IV, where full corpora will be found.

From the notes to Figures 57 and 58 we see that m,n occur in Twana probably only in loan words, whether from European, Puget Sound or other Salish languages; but in all word-positions (Fig. 59). While Twana is one of the few languages of the world apparently possessing 'no nasals,' it is clear that Twana b,d in all cases go back to Salish nasals m,n (Fig. 60). On the other hand (as Fig. 61 illustrates), utterance initially, b,d freely alternate with ^mb, ⁿd (Fig. 61[a]); an occasional occurrence is also found intervocalically, although almost only in texts.¹ Figure 61(b) illustrates that (only in texts) b,d occasionally appear as m,n before a morpheme-boundary before a dissimilar stop d,b. Lastly (Fig. 61[c]), we note that d is often lost² morpheme-finally before morpheme-initial voiceless stops, while t is not.

From the above summary, we conclude that we might simply utilize [nasality] to distinguish b,d from l,w,y. On the other hand, the occurrence of m and n in words not clearly borrowed requires us to distinguish between b and m, and between d and n.

Suppose we have defined b,d as including [+nasal], as well as [+voice] in the corresponding segments of the relevant dictionary entries. If, then, the proper environment for glottalization in augment reduplication is defined as [^{+voice}_{-nasal}], b and d segments are excepted by virtue of their being specified as [+nasal]. But this is counter-intuitive, for it hardly seems plausible that it is nasality that inhibits glottalization--we should expect the opposite! What is more, we have not distinguished b,d from 'true' m,n in the dictionary.

So far as occurrences of 'true' m,n are concerned, it is open to us to suggest that, since certain morphemes contain segments which always³ have phonetic m,n as their output, we may simply label these morphemes [-native]. This would allow them to pass through the grammar unaffected by

¹For both positions of occurrence, it is curious that the dental is involved very rarely, in comparison with the labial. Compare the inverse relation for Quileute initial-position, Andrade (1929), p. 156. Quileute, of course, has b,d, and g.

²See n-loss, Chap. II, sec. 19.

³The informant would accept the pronunciation, on my part, of b/d in such words without comment, but never herself replaced m/n by b/d except as delimited above.

any rules marked as applying to [+native] morphemes; thus we require merely to mark rules applying to b,d as [+native].

The question now arises, whether it might not be preferable to mark only the segments involved, and not the entire morphemes. If we do this, however, we are implying that there may, within the same morpheme, be segments to be marked as [+native] and other segments to be marked as [-native], a situation that seems not to occur in languages generally. With this in mind, we seek an explanation of the following apparently 'mixed' forms in Twana:

Examples:

xə́qanbə́d	(~ xə́qədbə́d)	landing-place
sə́wəsəmbə́x ^w	(~ sə́wəsəbə́x ^w)	it flooded
tə́móləčə́d		barrel
tə́m ⁷ ə́tə́d		rope

The first two cases are tri-morphemic, and represent dissimilations at morpheme-boundaries (in fast speech) mentioned above.¹ For the other cases too, however, all our understanding of Twana leads us to be almost certain that these are not single morphemes.² We are thus enabled to assign [native] to the relevant morphemes as a morpheme-feature.³

We return now to the question, how are we to avoid the completely arbitrary implication that segments marked as nasal are nevertheless not liable to the glottalization rule? One simple way of accomplishing this would be to assume that the sound change producing b,d from Proto-Salish m,n was a change involving not primarily a loss of nasality (the allophony and dissimilation phenomena mentioned above would militate against that in any case), but rather a change of obstruency for [+nasal] segments in [+native] morphemes.⁴ If we assume that the sound-change was of the type characterized as 'unconditioned,' it is implicit in a generative formulation that there has been a re-structuring of the phonological specification of segments of dictionary entries.

¹For re-interpretation, see Chap. IV, sec. 7.

²We shall rehearse the evidence bearing on the possible etyma in another place.

³By a convention we shall, however, mark only [-native] morphemes.

⁴For further discussion, see Chap. IV, sec. 3.7.1.

Such an assumption would lead us to define b,d as $\begin{bmatrix} +\text{nasal} \\ +\text{obstruent} \end{bmatrix}$ in dictionary entries. 'True' m,n may then be distinguished as $\begin{bmatrix} +\text{nasal} \\ -\text{obstruent} \end{bmatrix}$; a distinction whose rare employment we are forced to explain as resulting from their [-Native] (i.e., loan) status,¹ although we observe that no such morpheme-feature is in fact required in the dictionary in the present formulation.

Suppose now, alternatively, we wish to infer, from the allophony and dissimilation phenomena mentioned, that the change of obstruency by which the glottalization rule may be prevented from operating on b,d in fact represents a conditioned sound change, and that it operates only optionally for these allophony and dissimilation environments, and not at all for m/n segments in morphemes containing 'true' m,n.

In this case, we should require to leave all the m,n,b,d segments as underlying non-obstruent nasals in the dictionary. At some point prior to the glottal-stop rule, we should then insert a rule [say, rule X], optional for the relevant (e.g., assimilation) environments, changing the obstruency of m,n to plus. To convey our assumption that 'true' m,n are exceptions to the rule, we must then mark all forms containing them as [not rule X].²

In the present analysis, the glottal-stop rules are formulated in exactly the same way as before; either formulation will still leave the need for a later rule to (optionally) delete the nasal quality of nasal voiced obstruents. What has changed is our interpretation of the historical facts: instead of assuming an unconditioned sound change, with immediate restructuring of dictionary segments,³ we have here assumed the addition of a rule to the phonology.⁴

¹The use of [-Native] as a cover-term for 'behaving differently' is potentially misleading. See fn. 2 below.

²This corresponds to our ignorance of the conditions on the exception. If we knew these, we should of course incorporate them into the rule for the change of obstruence. We prefer to avoid the term 'Native,' which hides our ignorance.

³Perhaps more correctly, 'restructuring of dictionary segments as a result of a change in morpheme-structure conditions.'

⁴From the point of view of external reconstruction, we imply that Twana differs, not in its dictionary entries, but by the addition of this particular rule. Although the shapes of dictionary entries do not change, the m,n forms are affected to the extent that a rule feature has been added to them.

II.9. Glottal Absorption

<u>Unaugmented</u>	<u>Augmented</u>	<u>Gloss</u>
bále	bəl-bále	fish-egg; bait
bóle	bəl-bóle	spring (of water)
bolʔóq ^w	bəl-bóʔlaq ^w	tangle up.
báyac } ~ báyʔac }		meat
sa-dəʔwat	sa-do-dəʔwat	wave (in the sea)

Fig. 15.--Glottal Absorption

The motive for attempting to distinguish b,d as a natural class from l,w,y, was that the output strings for augment showed a glottal stop derived with the latter but not with the former. However, Figure 15 shows that there are forms where an expected glottal stop is in fact not present in the output. The underlying forms for the augment are, respectively: *bal-bále 'bait,' *bol-bóle 'spring,' *bol-bolʔóq^w 'tangle,' *s-dəw-dəwʔat 'wave.'¹

But to derive the correct outputs we must still make one of two alternative assumptions. We could, first, assume that these forms are 'exceptions' to the rule for glottal stop in augment, marking the relevant dictionary entries appropriately.² However, in the light of the distinction we have just discussed concerning the underlying nature of b,d, another alternative is now open. Suppose we assume that underlying segments specified as [_{+voice}^{-voc}] are all relevant environments for the glottal stop rule, so that underlying m,n are affected as well as l,w,y.³ For clarity at this point,

¹ In accordance with the analysis of s-cóbʔ 'crab-apple,' etc. See p.47.

² That is, although they meet the structural description of the rule, they are not to follow it. See Lakoff (1965) for the notion of 'structural description' and 'rule' features, within a general theory of the nature of linguistic exceptions.

³ We allow 'true' m,n to produce glottal stops in the same way. This allows our rules the greatest power we may give them, bearing in mind however, that the evidence for the behavior of 'true' m,n is so scanty as to be quite inconclusive.

we re-write these forms with m,n for b,d, recalling that they are specified

as $\begin{bmatrix} -\text{obstr} \\ +\text{nasal} \\ +\text{voice} \end{bmatrix}$

Thus: mal- mále, mol- móle, mol-mol[?]óq^w, s-nəw-nəw[?]at.

With the above assumption on the domain of the glottal-stop rule, and applying the other rules we have developed in their original order, we now derive:

m[?]l-mále, m[?]l-móle, m[?]l-mól[?]aq^w, s-n[?]w-nəw[?]at (stress-retraction and development of [?]).

ml[?]-mále, ml[?]-móle, ml[?]-mól[?]aq^w, s-nw[?]-nə[?]wat ([?]-metathesis).

" " " s-no[?]-nə[?]wat (semi-vowel rule).

The glottal-absorption rule as originally conceived¹ did not require us to specify how a choice would be made in the case (as at present) of a glottal stop falling between equally applicable segments. Since we shall hold that the loss of glottal stop for the above forms rests on the incompatibility of glottalization and voiced obstruence in the same segment,² it is crucial that the absorption should be by the segment towards the stress.³ We must not derive **ml[?]-móle, for this would (implausibly) make that form an 'exception' again.

The above account might be summarized informally as follows: 'after attraction across any consonant, towards the stress, a glottal stop is absorbed by an adjacent voiced consonant.'⁴ Nasalized voiced non-obstruent consonants (except in certain morphemes⁵ so marked in the dictionary) are then made obstruent. Such obstruents then lose the glottal component.'

However, there are certain forms in the corpus, in which a glottal stop does appear adjacent to a voiced (nasal) obstruent, which apparently contradicts the above account. Thus it seems that either the glottal-

¹See p. 45.

²The matter is argued in Chap. IV, sec. 3.7.1.

³We assume that təb-təbax^w 'lands,' yəd[?]yədás 'teeth,' etc., are derived in parallel fashion; the rule must thus allow absorption to a voiced segment towards the stress, or to an adjacent preceding voiced segment, in that order.

⁴Compare the penetrating account in Sapir (1938).

⁵The 'true' m/n forms. Cf. Chap. II, sec. 8, end.

absorption or the glottal-loss rule must be constrained so as to operate only in the environment 'Augment'; the 'anomalous' forms are not augmented forms, and would thus be distinct from the latter.

Although the constraint of rules to particular morphologically-defined environments is by no means uncommon, we should still prefer¹ a more powerful formulation if possible. We shall therefore examine some typical environments in which glottal stop is retained next to b/d.

héʔd	~	hédʔ	a long time
s-cóʔb	~	s-cóbʔ	crab-apple
dəčáʔd	~	dəčádʔ	where
bəščəʔd	~	bəščádʔ	louse
čaláʔd	~	čaládʔ	coal
s-lóʔb	~	s-lóbʔ	soup
ʔas-sóʔb-dəx ^w		sobʔód-as	smelled; smell it
q ^w éx		dəx ^w -q ^w éx-əbəd	fry; frying pan ¹
s-téq ^w ab		dəx ^w -téq ^w əb-ʔəd	toy; game
ʔabéd		ʔabéʔdəbəc	hair; body-hair

Fig. 16.--Glottal Stop Abutting Voiced Stop

¹ dx^w-stem-bd is a common instrumental nominalization.
Cf. be-téq^w-ab : -ab is a verb-deriving suffix; be- is an aspect prefix.

Leaving aside details not germane to the present discussion, we note the following points of interest in Figure 16. First, there is clearly an optionality in the glottal-attraction rule, at least for the environment 'in pause.' Since there is a priori no reason to suppose that 'pause' attracts a glottal-stop, whereas stress clearly does so, we must assume that the forms concerned (héʔd ~ hédʔ etc.) are underlyingly of the shape -CVC?, i.e., contain a final glottal stop in their dictionary entries.

Forms of the shape of ʔasóʔbdəx^w may reasonably be assumed to be

¹ If only because of the historical implications of the general account of the sources of glottal stop in Twana.

*sób?, parallel to s-cób?, which we have already discussed (see p.47).

The nominalizations of type dx^w -stem $-bd$ contain glottal stop if the stem-final consonant is also $-b$; clearly, there must be a geminate-resolution rule, one of whose sub-parts derives $ʔ-b$ from $*b-b$. As has already been shown, such a rule must follow s-assimilation (cf. Chap. II, sec. 7.6). The same geminate-resolution rule will also handle the case of $ʔabéʔdabac$, which is clearly derived from $*ʔabéd-dabac$, applying the rules for vowel-loss beyond the stress ($ʔabéd-dbc$), then geminate resolution ($ʔabéʔdbc$), then shwa-insertion ($ʔabéʔdabac$).¹

Thus, for the stage characterizable as 'immediately after the glottal-attraction rule,'² the forms of Figure 16 have the following shapes--taking only the segments immediately adjacent to the glottal stop:

- i) for $héʔd \sim hédʔ$, etc. $\#C\acute{V}ʔ\# \sim \#C\acute{V}C\#$

By contrast, now, the relevant augmented forms are given, at the same stage of derivation:

- i) for $w\acute{d}-ʔ-w\acute{d}aw$
 ii) for $b\acute{l}-ʔ-b\acute{o}le$
 iii) for $t\acute{b}-ʔ-t\acute{b}ax^w$
- } -CʔCVC-

It seems that the environments are sufficient to distinguish the products of an absorption rule formulated in the following terms:

Glottal-absorption:³

$$\left\{ \begin{array}{l} [ʔ] \begin{bmatrix} +voice \\ +cons \end{bmatrix} \\ \begin{bmatrix} +voice \\ +cons \end{bmatrix} [ʔ] \end{array} \right\}^1_2 \longrightarrow \begin{bmatrix} +cons \\ +voice \\ +checked \end{bmatrix} \text{ in env. / } - \left\{ \begin{array}{l} [\emptyset] \\ [+cons] \end{array} \right\}^1_2 \begin{bmatrix} -cons \\ +voc \\ +stres \end{bmatrix}$$

Obstruency Rule:

$$\begin{bmatrix} +voice \\ +nasal \end{bmatrix} \longrightarrow [+obstruent]$$

Glottal Loss Rule:

$$\begin{bmatrix} +obstruent \\ +voice \end{bmatrix} \longrightarrow [-checked]$$

¹The final ordering of these rules will not invalidate the argument here, though of course many more rules are intercalated.

²And thus, of course, excluding the forms with glottal-stop not yet generated at this point in the rules.

³Glottal stop is to be defined later (Chap. II, sec. 18). This rule is modified later (Chap. II, sec. 13). N.B. The bracket numerals order the sub-parts of the rule.

As already mentioned,¹ 'true' m,n will be exempted from the Obstruency Rule by virtue of the morpheme-feature. [not Obstruency Rule] associated with the relevant dictionary entries. The Glottal-Loss Rule, in turn, requires no 'environment,' since the Glottal Absorption Rule unambiguously creates glottalized, voiced obstruents only in environments where we suppose the Glottal-Loss Rule to operate.

In the light of the foregoing discussion, the ordering of the rules for ?(and Y) metathesis, glottal absorption, and vocalization of semi-vowels² may be clarified.

For yaššad; šeʔyaššad 'foot,' the order is not crucial. Thus, yašš-yāššad, yʔš-yāššad (V-loss), šyʔ-yāššad (?Y-metath). Now, (i) glott-absorp šy-yāššad : (ii) S/V še-yāššad
or (i) S/V šeʔ-yāššad: (ii) glott-absorp.še-yāššad

On the other hand, taking R^wóy; R^weʔ-R^wóy 'mother,' the order proves to be crucial. Thus:

R^wóy-R^wóy, R^wʔy-R^wóy (V-loss), R^wyʔ-R^wóy (?-metath)
Now, (i) glott-absorp R^wy-R^wóy --this leaves no way of deriving R^weʔ-R^wóy which is not ad hoc, whereas

(ii) S/V R^weʔ-R^wóy is correct, and glottal-absorption does not apply.

It is thus clear that the order of these rules is:

1. ?, Y - metathesis.
2. Vocalization of semi-vowels.
3. Glottal absorption.

II.10. Rule Summary 2

(Ordered, but still tentatively confined to Augment, except where otherwise specified.)

1. Reduplication Constituent Structure = C₁V₁C₂, unstressed (for non-laryngeal stems).
2. Stress assignment--to first syllable of stem (and original stress is diminished).
3. Mutation of vowel under secondary stress.
- *4. V → h in unstressed syll of Augment.
h → Ø in / - voiceless stop.
h → ʔ in / abutting a voiced consonant.
V → Ø. Conditions: shwa pretonic; post-tonic, except before final h.

¹See p. 66.

²Cf. Chap. II, sec. 3.3.

- *5. ? methathesis, across any segment, towards the stress.
- **6. Y-metathesis.
- 7. Semi-vowel vocalizes, between consonants.
- *8. ? -absorption by voiced consonant

a) towards the stress	}	Constrained by Structural Description
b) otherwise		
- **9. Nasals become Obstruents. Not limited to Augment.
- **10. ? -loss on voiced obstruents. Limited by S.D. of Rule 8.
- *11. Cluster-simplification.
- **12. s-assimilation (?as- prefix).
- *13. Geminate resolution.
- *14. Shwa insertion, conditions partly established. Not limited to Augment.
- **15. Nasal obstruents (optionally) lose obstruency before dissimilar nasal obstruents at morpheme boundary. Not limited to Augmented.
- **16. Voiced obstruents lose nasality (optionally) after pause. Not limited to Augment.¹

II.11. Summary of Stress and Vowel-Loss Phenomena

The above discussion completes our basic account of the development of glottal stop, so far as its appearance seems to depend upon the morphology of 'Augmentative.' This is a suitable point at which to sum up the conditions under which post-tonic stem vowels are lost, using the same basic Corpora as our data.

For di-syllabic stems with primary stress on the first syllable (type š-čótax ; š-čt-čótax 'halibut'), the stress-retraction rule operates vacuously on the augmented form; this leaves the correct stress as š-čt-čótax, no vowel-loss occurring.

For di-syllabic stems with primary stress on the second syllable (type tábex^w ; táb-tábax^w 'land'), the stress is retracted in the augment; the second syllable, now carrying secondary stress, has the vowel a, regardless of the quality of the original vowel. If the first vowel of the stem is shwa, this vowel is lost in the unmarked form;² but the augmented form never loses a stem vowel.

¹*signifies a modification to a rule, as compared with Rule Summary 1, Chap. II, sec. 6. **signifies the insertion of a new rule, of course with renumbering.

²We take up the question of the loss of unstressed shwa in the un-augmented form of di-syllabic stems, immediately following this summary.

For tri-syllabic stems (type s-iḡáḡad ; s-ḡ-iḡáḡad 'arm'), however, both post-tonic vowels must be considered to be lost in the augmented forms, with the exception of a vowel before final h.

It is crucial to bear in mind that for many stems encountered, it was necessary to reconstruct underlying forms of slightly different shape than that of the unaugmented form. Such reconstructions have so far taken two different forms: for some, a shwa had to be assumed to be present in the first syllable (e.g., s-xḡáb; s-xḡ-xḡáb 'cockle,' reconstructed *s-xḡáb),¹ while in others a glottal stop had to be assumed to have been attracted towards the stress in the unmarked form (s-čáʔyat ; s-čéʔ-čáʔyat 'fish gill' reconstructed *s-čáyʔat).²

With these provisos, the following formulae represent a summary of our conclusions concerning stress position and vowel-loss so far.³ For clarity of presentation, the formulae refer to stem-vowel segments only.

<u>Di-syllabic Stem</u>		<u>Tri-syllabic Stem</u>	
<u>Unaugmented</u>	<u>Augmented</u>	<u>Unaugmented</u>	<u>Augmented</u>
* - ṽ v	-ṽ v	*-ṽ v v c	-ṽ ∅ ∅ c
* - v ṽ	-ṽ <u>a</u>	*-v ṽ v c	-ṽ ∅ ∅ c
		*-ṽ v Vh#	-ṽ ∅ Vh#
		*-v ṽ Vh#	-ṽ ∅ Vh#

¹See Chap. II, sec. 4.

²See Chap. II, end of sec. 3.

³The corpus so far discussed contains so few stems in which more than two vowels follow the stress, that we are obliged to postpone discussion of vowel-loss for such stems until we treat Attenuative: there, owing to retraction of the stress to the Attenuative prefix itself, we may see clearly the loss of vowels over the longer spans we seek (see Chap. III, sec. 3).

Pretonically, stem vowels stand except shwa (lost between voiceless consonants). The vowel in the stative prefix 'as- is lost when it stands more than one syllable from the stress.

II.12. Glottal Stop in Unaugmented Stems

II.12.1 Clear Cases

	<u>Augmented</u>	<u>Unaugmented</u>	<u>Gloss</u>
(a)	čot-čəwəs	čotəs ~ čəwəs	wife
	šoʔ-səwəl	šoʔəl ~ šəwəl	road
	s-yoʔ-yəwas	s-yoʔəs ~ s-eʔwəs } ~ s-yəʔwəs }	wood
	s-x ^w eʔ-x ^w əyač-šəd	s-x ^w eʔəč-šəd	ankle
	yəlʔ-yəlax	yəlʔəx	gather
	pəlʔ-pələq ^w	pəlʔəq ^w	gravel-cooking
	q ^w əlʔ-q ^w əlab	q ^w əlʔəlab ~ q ^w əlʔəb	sinking ¹
(b)	s-yəlʔ-yəláb	s-yəlʔəb ~ s-yəláb	year
	q ^w əlʔ-q ^w əlde	q ^w əlʔəde ~ q ^w əláde	ear
		šəlʔəs ~ šələs	fish
		qəlʔəb ~ qəláb	bad ²
		ščəlʔəb ~ ščəláb	liver
		ʔəs-həlʔəb ~ ʔəs-həláb	hot
	ʔəs-la-hšle-l	həlʔé	alive ³
	('we are alive')	qəbʔəd ~ qəbád	axe ⁴
		sx ^w éšəđ	deer ⁵
		sq ^w əšəb	fog ⁶
(c)	<u>Stem</u>		<u>Gloss</u>
	šəʔəb	šəyəʔəb-at	crab
	x ^w eʔəčšəd	x ^w eʔ-x ^w əyačšəd	ankle
	x ^w eʔəčče(h)		wrist
	x ^w eʔəxad		cut-off arm
	x ^w eʔáp		bob-tail
	dəʔwéh ~ dəʔwəʔ ~ dəʔwə		thou
	čəʔwə(h)t		fine
	pəlʔəd		bark

(c) (cont.)	Stem	Gloss
	x ^w əlʔəpəle(h)	cottonwood tree
	qəlʔéčay	willow tree
	q ^w əʔwác	ash

Fig. 17.--Glottal Stop in Stems

¹ q^wəl, + V₁C₂ post-reduplication for Inceptive, +-(a)b derived Intransitivizer. Vowel-loss in the first syllable then gives glottal-stop, which is attracted by the stress to give q^wəlʔ-əl-ab.

² Compare qéʔəqəlab (Attenuative, Chap. III, sec. 3).

³ For the Augmented form, see 'ʔ/h-initial stems' (Chap. II, sec. 17). For h-loss finally, see Chap. II, sec. 15.3.

⁴ Compare qəbéʔd-aʔ (Attenuative, Chap. III, sec. 7.1).

⁵ We note that geminates are not always simplified. Compare s-láday; s-láday (Augment) (see d-loss, Chap. II, sec. 19). Elmendorf s^wəyʔsəd.

⁶ Elmendorf sq^wəʔsəb.

Having discussed the development of glottal stop in the augment, together with the vowel-losses consequent upon stress shift, we turn now to a converse but parallel topic, namely, the development of glottal stop in the unaugmented forms themselves. We shall suggest that the development of glottal stop must be considered a phenomenon not at all confined to the augment, but one very closely bound up with all vowel-loss in conjunction with remoteness from stress. The conditions for glottal absorption will require revision.

The forms of Figure 17(a) show the alternation ʔ ~ Ø not only at the morpheme-boundary between the stem and the reduplicating syllable, which has been our interest so far: they also show that glottal stop found within unaugmented stems is sometimes in alternation with Ø in the corresponding augmented forms. The existence of forms such as the following, shows that the alternation is not one characterizable as 'automatic'; that is, it is not the case that such glottal stops found in the augmented forms are never present in the unaugmented forms.

Examples:

ʔas-xəlʔ	;	ʔas-xəlʔ-xəlʔ	marked
s-ɬáʔwaltx ^w	;	s-ɬoʔ-ɬáʔwaltx ^w	roofing
ʔas-láwʔ	;	ʔas-ɬoʔ-láwʔ	baked
s-q ^w óbayʔ	;	s-q ^w əb-q ^w óbayʔ	brain
s-čáʔyat	;	s-čəʔ-čáʔyat	salmon-gill

If the alternation is not automatic in the sense defined, then what controls it? We notice immediately that the glottal stops with which we are concerned, such as that in the unmarked čoʔás ~ čəʔwas 'wife,' are again always found adjacent to a 'resonant' in disyllabic stems with unstressed first syllable. Second, we recall that we found it simplified the rules to assume that unstressed shwa in oxytone stems such as -*xəpáb 'cockle' is lost 'between voiceless obstruents.' We then suggested that, since a shwa-insertion rule would in any case operate if either of the consonants of the reduplicating syllable were voiced, we might well assume that a shwa vowel in the reduplicating syllable is always lost.

A similar interpretation may be placed on the development of the glottal stops now under discussion. If we take as the underlying forms shapes such as (e.g.) *yaláx 'gather,' *šəyáb 'crab' we may suggest that the loss of an unstressed vowel separated from the stress by at least a 'resonant,' results in the generation of a glottal stop.¹ Note that we frame the hypothesis in the most powerful form possible.

The respective outputs of these underlying forms are the expected yalʔáx, šəʔáb (with glottal attraction, and subsequent vocalization of y). However, as will be seen from Figure 17(b) above, there are cases where shwa must again be supplied to the underlying form, although with a different outcome in the unmarked form. As an example, take the augmented form q^wəlʔ-q^wəlab 'all sunk.' Assuming an underlying stem *q^wəláb, we expect **q^wəlʔáb for the unmarked form; but the correct output is q^wəl-áb.

We do not possess enough evidence to be clear as to the proper explanation of this alternation,² although a possible source for at least some

¹The intermediate h is, of course, assumed, but omitted as not relevant to the present discussion.

²Data from Nisqually (a neighboring Puget Sound language of the Salish family) shows that a stress-shift has occurred, probably in Twana

of these stem glottal stops may be the existence of geminates in the underlying forms.¹

What now is the appropriate explanation of such an alternation as Figure 17(a) exemplifies in freely-varying pairs like čó[?]ás[?] ~ čə[?]wás[?]?

The following examples show the same phenomenon:

Examples:

s-cób [?]	~	s-cóʔb	crab-apple
čatád [?]	~	čatáʔd	coal
ho [?] ól [?]	~	ho [?] óʔl	really
s-q ^w əbáy [?]	~	s-q ^w əbáʔe	dog
dəx ^w -láu [?] -bəd	~	dəx ^w -láʔo-bəd	strainer
pálʔel	~	páʔlel	resurrect

Clearly, the alternations rest on an option in the glottal-attraction rule.²

II.12.2 Probable Cases

Figure 17(c) shows a sample of further di- and tri-syllabic stems for which, again, we might suggest the glottal stop in an unmarked form has originated by loss of shwa in an unstressed syllable before the stress. The first three forms are given as a parallel, for we can show the alternation for these cases.

(cf. Tw. yədəs, Nis. ýədəs 'tooth,' Tw. yəl'əb, Nis. ýálədəb 'year'.) Considering the forms for 'year,' it is clear that Twana has lost a d; this is a result either of the resolution of the cluster *yld, or a loss of d before a consonantal affix b, after vowel loss due to stress-shift (yálVdVb — ylVdb). The alternative explanations correspond to stress-shift of 2 and 1 syllable, respectively. For the d-loss rule, see Chap. II, sec. 19.

There is some reason to hope that situations of this kind may prove recoverable within Twana. The matter will be discussed in detail elsewhere but can have no further place here.

¹For the resolution of geminates at certain morpheme-boundaries by generation of glottal stop, see Chap. II, sec. 9, esp. p. 70.

²The option seems never to be taken in the case of glottal-stops generated in the reduplicating syllable of the augment. If we assume this is an absolute constraint, then we may incorporate it into the rule: if not, then there seems no way of formalizing whatever statistical knowledge we may have on the application of the option. The alternants wədəʔboy ~ wədəbəʔwe 'blackberry' of Figure 18 are due to the same option.

For the forms $dəʔwéh$ 'thou' and $čəʔwá(h)t$ 'fine,' the question must remain undecidable inside Twana;¹ whereas for the rest of these forms, we should require to know the augmented forms to be certain that the glottal stop is not 'original.' To clarify this point, let us derive the alternative plurals for $pálʔád$. If it proved to be $**pəlʔpáʔlad$ (with glottal attraction), the glottal stop is clearly 'original'; but if it were $**pəlʔ-pálad$, then the glottal stop must be 'secondary,' produced in the manner suggested above.

II.12.3. A Select Twana Herbarium

	<u>Fruit</u>	<u>Plant</u>	<u>Gloss</u>
(a)	$bəcák^w$	$bəcák^w ay$	black-cap
	$qapóx^w$	$qapóx^w ay$	hazel
	$təbʔəx^w$	$təbʔəx^w ay$	gooseberry
		$qéʔčay$	moss
		$həbəbay$	cascara
		$dəčay$	rye grass
	$čeq^w éq^w$	$čeq^w éq^w ay$	blue elderberry
(b)	$téleq^w$	$télʔq^w e$	wild strawberry
	$wədəbax^w$	$wədəʔboy \sim wədəboʔe$	blackberry
	$yətáwad$	$yətáʔode$	salmon-berry ¹
	$sətəlaq$	$sətəʔqe$	chimble-berry
	$ščəʔwélas$	$ščəʔwélʔse$	red huckleberry
	$čəʔyóx^w əʔas$	$čəʔyóx^w əʔese$ $\sim čəʔyóx^w əʔaseʔ$ }	Oregon grape
Compare	$ʔəsále(h)$: $ʔəsáʔi-əʔ-čəʔwəs$	two, doubly-wived ²

Fig. 18.--Twana Plant Names

¹Cp. Unaugmented $yətəwəh$ (Elmendorf) and see Chap. II, sec. 8 for loss of $dʔ$.

²-əʔ- makes adverbial phrases.

¹Since the plural of $dəʔwéh$ is suppletive; thus $tə-wəlʔ-wəlap$. No plural is attested for $čəʔwá(h)t$. The external comparison, on the other hand, shows g^w in (e.g.) Nisqually. For Twana $čəʔwás$ 'wife,' cf. Nisqually $čəg^wəs$; and for Twana $dəʔwéh$, 'you,' cf. Nisqually $dəg^wəʔ$.

One further set of forms, those of Figure 18, will be used to illustrate the development of glottal stop within stems. In the cases now to be discussed, however, we have to do with glottal stop after the stress. The alternation is produced by the addition of a stem-formative suffix,¹ -ay² 'growing thing'; this results in vowel-loss in certain cases, according to the conditions summarized above (Chap. II, sec. 11) for di- and tri-syllabic stems.

Sub-corpus (a) shows the simplest condition, parallel to the case of unmarked di-syllabics such as š-čótax 'halibut,' where no vowel-loss occurs. Thus, qapóx^w; qapóx^w-ay 'hazel-nut,' where the single vowel after the stress is retained.

In sub-corpus (b) however, an original di-syllabic (such as s-lálaq 'thimble-berry') now becomes a tri-syllabic (viz., *s-lálaq-ay); the result is that both the vowels following the stress are lost. Deriving this form in stages, we notice a fresh condition for vocalization of a semi-vowel. We have *s-lálaq-ay, then s-lálaq-y (by vowel-loss). But the output is in fact s-lálaq-e. It seems that -y vocalizes finally as well as in the environment C-C (as in *k^woy-k^wóy, k^wy-k^wóy, k^wyʔ-k^wóy, k^weʔ-k^wóy 'bent').³

The remaining forms of the sub-corpus show, in addition to the vocalization just discussed, the development of a glottal stop from the loss of an unstressed vowel adjacent to a stressed one, with intervening 'resonant.' Thus téleq^w, but tél^ʔq^w-e 'wild straw-berry.' Although no plural is attested, we may surmise that the form š-čəʔwélas; š-čəʔwél^ʔs-e in fact also exhibits a derived glottal stop in its first syllable, in the manner demonstrated for such forms as čəʔwáš ~ čəʔáš; čəʔ-čəwáš above p. 74.

¹Here we see, in effect, that a derived stem (whether by stem-formative suffix or prefix (the augment) behaves in the same way as the unmarked stem. We shall later contrast this with the different behavior of the complex stem plus (e.g.) 'possessive.' For the implications for constituent structure, and thus for the cyclical application of the rules, see Chap. II, sec. 15.2.

²Shown (p. 79, fn. 3) to be *ayh.

³On the other hand, the alternant čəʔyóx^waʔeseʔ 'Oregon Grape plant' shows a final glottal stop which, as will be seen (see Chap. II, sec. 15.4), can only derive from h in cluster with y, w, l. We thus conclude that the suffix 'plant' is *-ayh. The vocalization of this y (when the truncation rule deletes the vowel) is thus quite according to the original formulation, using environment 'Consonant - Consonant.'

The last two forms of the sub-corpus suggest that, perhaps only under limited conditions not yet fully understood, immediate adjacency to the stress is not a necessary condition for the generation of a glottal stop from the loss of a vowel, although the presence of a 'resonant' adjacent and towards the stress is necessary.

Let us see whether, using only the rules we have, we can reconstruct a suitable underlying form for $\text{co}^{\text{yox}}\text{e}^{\text{as}}$ 'Oregon grape.' If the rules suggested above are correct, then within a stem, the two vowels following the stress should be lost. Then assuming that the underlying form has the shape $-\acute{V} V VC$, either the e in $\text{co}^{\text{yox}}\text{e}^{\text{as}}$ is anomalous, or the rule is wrong. The final ə is irrelevant, since it may be a shwa-insertion replacement of a lost original vowel.

However, the derived stem $\text{co}^{\text{yox}}\text{a}^{\text{ese}}$ 'Oregon grape plant' shows that the underlying form must have the shape (at least) $*\text{co}^{\text{yox}}\text{a}-$. Recalling that the glottal stop may perhaps not now be in the same position as in the underlying form (i.e., it may have been attracted by the stress), we tentatively suggest that the puzzling e vocalism is derived from an underlying y . If this were so, we should have the right to reconstruct $*\text{co}^{\text{yox}}\text{ay}-$. Let us, further, now assume that the glottal stop in $\text{co}^{\text{yox}}\text{a}^{\text{e}}$ is in fact derived from a vowel after the y which we have newly restored. We now reconstruct $*\text{co}^{\text{yox}}\text{ayVs}$.¹

The form $*\text{co}^{\text{yox}}\text{ayVs}$ would produce the correct output, giving $\text{co}^{\text{yox}}\text{y}^{\text{as}}$ by vowel-loss and glottal stop production, then $\text{co}^{\text{yox}}\text{e}^{\text{as}}$ by the semi-vowel rule, then $\text{co}^{\text{yox}}\text{a}^{\text{as}}$ by the shwa-insertion rule. To justify the suggested reconstruction, we cite also the form tk^{ayas} ; $\text{k-t}^{\text{ake}}\text{as}$, where an underlying $*\text{tak}^{\text{ayas}}$ must obviously be supplied. The derivation here is clearly the same as for the reconstructed $*\text{co}^{\text{yox}}\text{ayVs}$ above. Thus $*\text{tak-tak}^{\text{ayas}}$ gives $\text{tk-t}^{\text{aky}}\text{as}$ by vowel-loss and glottal stop generation, then $\text{tk-t}^{\text{ake}}\text{as}$ by the semi-vowel rule, then $\text{k-t}^{\text{ake}}\text{as}$ by cluster-simplification,² then $\text{k-t}^{\text{ake}}\text{as}$ by shwa-insertion.

¹Note that it is unnecessary to know what this vowel may have been; we cannot recover its quality, for it would always disappear in inflection or derivation. We do not know the etyma concerned (etyma, for it is almost certain that at least two morphemes are involved), but would hazard the guess that the last element is $-\text{ayas}$ 'round object,' as in $\text{dx}^{\text{w}}\text{-}\text{a}^{\text{as}}\text{-}\text{bad}$ 'eye,' analytically, 'round object, searching (a^{as}), plus agent-derivational dx^{w} + stem + bad .

²Chap. II, sec. 7.2.

As we shall amply confirm in treating the Attenuative, a form such as the derived $\text{č}^{\text{h}}\text{o}^{\text{h}}\text{y}^{\text{w}}\text{o}^{\text{h}}\text{x}^{\text{w}}\text{a}^{\text{h}}\text{e}^{\text{h}}$ also shows that the vowel-loss rule must be amplified somewhat to handle forms in which more than two unstressed vowels follow the stress. If we derive this form now, we see the following: $\text{*č}^{\text{h}}\text{o}^{\text{h}}\text{y}^{\text{w}}\text{o}^{\text{h}}\text{x}^{\text{w}}\text{ayas-ay}$ gives $\text{č}^{\text{h}}\text{o}^{\text{h}}\text{y}^{\text{w}}\text{o}^{\text{h}}\text{x}^{\text{w}}\text{a-}$; that is, we do not lose 'all the vowels following the stress.' Rather, 'the vowel following the stress is retained, provided at least two unstressed vowels follow.'¹

It remains to point out that even the first glottal stop in the form $\text{č}^{\text{h}}\text{o}^{\text{h}}\text{y}^{\text{w}}\text{o}^{\text{h}}\text{x}^{\text{w}}\text{e}^{\text{h}}\text{as}$ may in fact be 'secondary.' If the underlying form, by analogy with $\text{*č}^{\text{h}}\text{awáš} \rightarrow \text{č}^{\text{h}}\text{o}^{\text{h}}\text{wáš}$ above (Chap. II, sec. 12.1), is held to be $\text{*č}^{\text{h}}\text{Vwy}^{\text{w}}\text{o}^{\text{h}}\text{x}^{\text{w}}\text{ayas}$, then we could derive $\text{č}^{\text{h}}\text{wy}^{\text{w}}\text{o}^{\text{h}}\text{x}^{\text{w}}\text{y}^{\text{h}}\text{as}$ by vowel loss and ʔ -production, then $\text{č}^{\text{h}}\text{w}^{\text{h}}\text{y}^{\text{w}}\text{o}^{\text{h}}\text{x}^{\text{w}}\text{y}^{\text{h}}\text{as}$ by glottal-attraction,² then $\text{č}^{\text{h}}\text{o}^{\text{h}}\text{y}^{\text{w}}\text{o}^{\text{h}}\text{x}^{\text{w}}\text{e}^{\text{h}}\text{as}$ by semi-vowel rule, etc.

II.13. Stem-Internal Glottal Stop and Glottal Absorption

	<u>Unaugmented</u>	<u>Augmented</u>	<u>Gloss</u>
(a)	yadés	yad-ʔyadas	tooth
	cadéł	cad-cádał	he
	tabéx ^w	tab-tábax ^w	land
	wadáwʔ	wad-ʔwádaw	horn
	s-č ^w óbayʔ	s-č ^w ób-č ^w óbayʔ	brain
	s-q ^w ábáyʔ		dog
	hábéb-ay		cascara
	tabáx ^w		gooseberry
	qábác	qáb-qábac	wrinkled
	wadábax ^w		blackberry ¹
<hr/>			
(b)	sə-báded	sə-bəd-báde	mountain
	bádeh	bəd-bádeh	child
	k ^w ábəłəx ^w	k ^w əb-k ^w ábəłəx ^w	cedar root
	ʔas-łób	ʔəs-łəb-łób	scarred
	ʔas-x ^w əd	ʔəs-x ^w əd-x ^w əd	tired
	ʔas-k ^w ədad	ʔəs-k ^w əd-k ^w ədad	held
<hr/>			
(c)	<u>Unaugmented</u>	<u>Derived</u>	
	yatáwad	yatáʔwad-e	salmon-berry; - bush
	łéleq ^w	łélʔq ^w -e	wild strawberry; - bush
	č ^w əláde(h)	č ^w əlʔ-č ^w əlde(h)	ear; ears

Fig. 19.--Stem Glottal-Stop Absorption

¹ wadáʔbax^w (Elmendorf).

¹We delay the formal statement of the rule, for more conditions remain to be explicated (Chap. II, sec. 16, Rule Summary 3).

²It also seems from these examples that the glottal-attraction rule does not operate across more than one non-vowel segment (cf. pp.45-46).

It was shown above (Chap. II, sec. 9) that glottal stop must be held to be generated, in the augment, in association with b,d (that is, *m,n) as well as with l,y,w. We have now also shown that glottal stop may also be generated within stems, and that it must be held to be of phonological rather than morphological origin. It is thus reasonable to suppose that within stems, too, b,d are in fact proper environments for the generation of glottal stop. As will be seen from Figure 19, which draws together forms from various of the Corpora already given, output b,d are again found to lack the glottal stops we supposed to have been generated.

So far as sub-corpora (a) and (b) forms are concerned, the glottal-absorption rule requires only minor amendment. If the vowel-loss rule is applied to the unstressed (first) syllable of forms such as yǎ́és, a glottal stop is produced, just as it is for the corresponding augmented form: thus, both yǎ́és and yǎ́d-yǎ́das. The glottal-attraction operates on both these forms alike, to give yǎ́és ; yǎ́d-yǎ́das. Now the glottal-absorption rule operates on yǎ́d-yǎ́das to give yǎ́d-yǎ́das, but on yǎ́és to give yǎ́és.¹

Sub-corpus (c) recalls part of Figure 18 (sub-corpus [b]), from which it is noted that for the case of glottal stop generated from vowel-loss after the stress, the glottal-attraction rule seems to be optional,² at least for l. If this is the case, then we may also explain the form q̣^wǎ́lde(h); q̣^wǎ́l[?]-q̣^wǎ́lde(h) 'ear.' If we assume a derivation (for the augmented form) *q̣^wǎ́l-q̣^wǎ́lneh, then q̣^wǎ́l-q̣^wǎ́l[?]ne(h) then q̣^wǎ́l[?]-q̣^wǎ́l[?]ne(h), then we must assume that the glottal-attraction has not applied to the glottal stop after the stress, but the glottal absorption rule has applied, giving q̣^wǎ́l[?]-q̣^wǎ́l[?]ne(h); we may then assume the normal derivation for a glottalized nasal, viz., change of obstruency giving q̣^wǎ́l[?]-q̣^wǎ́l[?]de(h), then loss of glottalization on a voiced obstruent giving q̣^wǎ́l[?]-q̣^wǎ́lde(h), then shwa-insertion giving q̣^wǎ́l[?]-q̣^wǎ́lde(h).

We must extend the glottal-absorption rule to handle those cases such as q̣^wǎ́l[?]-q̣^wǎ́lde(h), where post-tonic absorption occurs as a result of the option on glottal-attraction. Schematically, the rule now has the following parts:

¹The original rule is modified only by the bracketing of the following environmental consonant before the stress. yǎ́és → yǎ́és now parallels exactly tǎ́-tǎ́bax^w → tǎ́-tǎ́bax^w (see p. 70).

²Compare a parallel situation in the development of glottal stops in the Attenuative where, again, an optionality is noted for l, although not for w.

$$\left\{ \begin{array}{l} [\text{?}] \begin{array}{l} +\text{cons} \\ +\text{voice} \end{array} \\ \begin{array}{l} +\text{cons} \\ +\text{voice} \end{array} [\text{?}] \end{array} \right\} \begin{array}{l} 1 \\ 2 \end{array} \rightarrow \left[\begin{array}{l} - \text{cons} \\ +\text{voice} \\ +\text{checked} \end{array} \right] \text{ in env. } / \left\{ \begin{array}{l} 1 \left\{ \begin{array}{l} \tilde{V}1- \\ -V \end{array} \right\} \\ 2 \left\{ \begin{array}{l} (C_x) \\ \check{V} \end{array} \right\} \end{array} \right\}$$

II.14. Twana Number Systems

<u>Cardinal</u>	<u>Ordinal</u>	<u>Distributive</u>	
dáhqas	təčələh	dáqs	one ¹
ʔəsále(h)	sʔəsələbs	ʔəsələ(h)	two ²
čəʔəs	ščəʔəsəbs	čəʔəʔəs	three
bósas	səbósəbs	bosósas	four
čxʷəs	sčxʷəsəbs	čxʷəxʷas	five
yəpáče(h)	syəpáčəbs	yəpəpče(h)	six
tḱʷós	sḱʷósəbs	tḱʷəḱʷas	seven
tqáče(h)	stqáčəbs	tqəqče(h)	eight
xʷəl	sxʷələbs	xʷəlʔələl	nine ³
ʔópədəčs	sʔópədəčsəbs	ʔópopədəčs	ten ⁴
cəb xáqʷ	scəb xáqʷəbs	-	twenty ⁵

Fig. 20.--Twana Numeral Derivations

¹'One' is suppletive in the Ordinal *čələh* 'fore, front.' 'One' is later shown to be perfectly regular in Distributive, Chap. II, sec. 15.8.

²While *ʔəsále(h)* could derive from *ʔəsələh* or *ʔəsályh*, distributive *ʔəsələbs* can only be from **ʔəsələh*.

³The distributive 'nine by nine' is quite irregular, but only ad hoc rules can be given, for it is the only monosyllabic numeral stem. The *a* in the last syllable suggests, of course, that the underlying string is **xʷəl-əl-əl*.

⁴The irregular stressing of 'ten' in Distributive is probably to be attributed to the (analogical!) operation of the optional rule for shifting stress to affixes (Chap. II, sec. 15.6). It is clear that no option in stress-assignment is involved, for we should otherwise get ***ʔóp-apədəčs*.

⁵'Twenty' is not attested in Distributive.

As a final demonstration of the rules for vowel reduction and generation of glottal stop in stems so far explicated, we take the derivational morphology of the Ordinal and Distributive Numerals (Fig. 20). Assuming that the constituent structure of Ordinal Numerals has the phonological spelling s-Num-ab-s,¹ the forms are discussed according to the number of vowels from the stressed vowel to the end of the stem.

The stems for '1,' '5,' '7,' '9,' and '20' retain the single vowel after the stress. On the other hand, the stems for '2,' '3,' '4,' '6,' '8,' and '10' lose the two vowels following the stress.

Note particularly, however, that the form *yapáčəbs* 'sixth' confirms the formulation we gave above (Chap. II, sec. 11) concerning the environment for vowel-loss. Reconstructing the underlying **s-yapáčə(h)-ab-s*, we see that both post-tonic vowels are indeed lost, for the *-ə* which is stem-final and word-final before *h* in *yapáčə(h)* is no longer so in the ordinal derivative.

It will be important later, in the discussion on *ʔ/h*-initial stems,² that here too, the rules are simpler if we assume forms like *ʔəsále(h)* 'two' and *ʔópədəčs* 'ten' to have glottal stop as their first segment, rather than hold the glottal stop as 'automatic for vowel-initial stems.'

The constituent structure of the Distributive Numeral is assumed to be C₁V₁C₂ plus V₁C₂³ plus the remainder of the unmarked stem. It is from the Distributive forms that we are able to recover the 'lost' vowels of the initial syllables for the (simplex) numbers 5, 6, 7, and 8. We are also able to show that a full vowel must be assumed for the second and third syllables of '10.'⁴ 'Nine' shows the development of a glottal stop in Distributive, in agreement with the discussion above (Chap. II, sec. 12).

The full underlying forms for Distributive are thus:

¹ -'Nom' - Numeral - ab(?) + s (possessive?).

² See Chap. II, sec. 17.2, and Chap. III, sec. 3.

³ The underlying structure cannot be (e.g.) **bós-os-as*, with the stress re-assigned by rule, for we should then get **basósas*.

⁴ We shall show that utterances phonetically transcribed as having initial glottal stop must also be so described phonologically (Chap. II, sec. 17.2, Chap. III, sec. 3). Here, it suffices to point out that the Distributives for '2' and '10' thus require no special rule for 'vowel-initial stems.'

- '5' * $\text{c}^{\text{w}}\text{x}^{\text{w}}\text{-}\acute{\text{x}}^{\text{w}}\text{-}\acute{\text{a}}\text{s}$ with unstressed $\acute{\text{a}}$ replaced by $\underline{\text{a}}$ and vowel-loss
- '7' * $\text{t}^{\text{w}}\text{r}^{\text{w}}\text{-}\acute{\text{r}}^{\text{w}}\text{-}\text{os}$ with unstressed o replaced by $\underline{\text{a}}$ and vowel-loss
- '2' * $\text{?}\text{a}^{\text{s}}\text{-}\acute{\text{a}}\text{s}\text{-}\text{aleh}^1$ with lowered vowel and vowel assimilation.²
- '3' * $\text{c}^{\text{?}}\text{o}^{\text{?}}\text{-}\acute{\text{o}}\text{?}\text{-}\text{Vs}$
- '4' * $\text{bos}\text{-}\acute{\text{o}}\text{s}\text{-}\text{as}$
- '6' * $\text{yap}\text{-}\acute{\text{a}}\text{p}\text{-}\text{a}\acute{\text{c}}\text{eh}$ with vowel-loss
- '8' * $\text{t}^{\text{a}}\text{q}\text{-}\acute{\text{a}}\text{q}\text{-}\text{a}\acute{\text{c}}\text{eh}$ with vowel-loss
- '10' * $\text{?}\text{op}\text{-}\acute{\text{o}}\text{p}\text{-}\text{VdV}\acute{\text{c}}\text{s}^3$ with vowel-loss
- '9' * $\text{x}^{\text{w}}\text{a}^{\text{w}}\text{1}\text{-}\acute{\text{a}}\text{1}\text{-}\text{a1}$

II.15. Twana Laryngeals

II.15.1. Introduction

In our treatment of the phonology of Twana so far, we have attempted to show the sources of certain glottal stops, and their relation to the processes of vowel-loss. In conjunction with this, we have developed rules for vowel-loss, demonstrating vowel-loss to be itself closely connected with stress alternations governed by the rules of constituent structure.

At the outset, however, we expressly omitted from consideration all stems with glottal stop or $\underline{\text{h}}$ in the root. We propose now to discuss in detail certain phenomena involving glottal stop and $\underline{\text{h}}$, an understanding of which will enable us to explore profitably two important further problems. These are, first, the behavior of $\underline{\text{h}}$ and glottal stop as C_1 or C_2 in stems in augment reduplication; and second, the source of the vocalisms in the reduplication for Attenuative, and the alternations exhibited by them.

At least five important facets of the parallel behavior of glottal stop and $\underline{\text{h}}$ will be examined. These are: laryngeal affection, glottal-stop derivation from $\underline{\text{h}}$, vowel-assimilation, stress-alternation, and $\text{?}/\underline{\text{h}}$ -attraction by the stress. In the process of the discussion we shall touch on some

¹See fn. 4, p. 84.

²See Chap. II, secs. 15.3.2, 15.5.

³The vowel-loss rule requires us to supply either no vowel or two vowels beyond the stress in the underlying form for 'ten.' We choose to supply two, on the basis of external comparison. Compare U.Cheh. $\text{pána}\acute{\text{c}}\text{s}$. The Puget Sound languages have 'ambiguous' shwa, as in $\text{pá}\underline{\text{d}}\text{a}\text{c}$ for Nisqually. It is likely that Proto-Salish 'ten' had two non-shwa vowels in the root; thus * $\text{?}\acute{\text{o}}\text{p}\underline{\text{a}}\text{n}$, contra Elmendorf (1962), p. 9.

evidence for the phonological Cycle for Twana, as well as developing criteria for the proper underlying specification of glottal stop and h.

For clarity of presentation, a single homogeneous body of data will be used for the initial discussion of glottal-stop and h phenomena. We choose the morphology of the possessive, for which a usefully large corpus is available, and shall supplement this as necessary with other data.

II.15.2. Affix Truncation

<u>Non-Possessive</u>	<u>3rd Sing. Possessive</u>	<u>1st Plural Possessive</u>	
(a) s-k ^w ól s-qáx ^w yabéd	s-k ^w ól-as s-qáx ^w -as yabéd-as	s-k ^w ól-ł s-qáx ^w -ł ~ yabéd-ł yabé-ł }	school ice fruit
wəqəb s-teqéw ʔas-q ^w ət də-sədəʔ	wəqəb-as s-teqéw-as ʔas-q ^w ət-as də-sədəʔ-as	wəqəb-ł s-teq-ew-ł ʔas-q ^w ət-ł də-sədəʔ-ł	box horse fire belongs to
(b) q ^w éle čəqpe s-pəčo	q ^w éle-s čəqpe-s s-pəčo-s	q ^w éle-ł čəqpe-ł s-pəčo-ł	cedar fir berry basket
(c) s-x ^w ák ^w k ^w sk ^w əspł q ést	s-x ^w ák ^w k ^w -s sk ^w əspł-s q ést-s	s-x ^w ák ^w k ^w -ł sk ^w əsp-ł q ést-ł	breath trout cow
(d) ʔásax ^w k ^w tábac s-láday	ʔásax ^w -s k ^w tábac s-láday-s	ʔásax ^w -ł k ^w tábac-ł s-láday-ł	seal husband woman
(e) šáw [?] wədáw [?] pəwáy [?] s-q ^w əbáy [?] s-ədəx ^w -qól [?] čalád [?]	šáw [?] -as wədáw [?] -as pəwáy [?] -as s-q ^w əbáy [?] -as s-ədəx ^w -qól [?] -as čalád [?] -as	šáw [?] -ł wədáw [?] -ł pəwáy [?] -ł s-q ^w əbáy [?] -ł s-ədəx ^w -qól [?] -ł	bone horn flounder dog blood coal
(f) təbáx ^w spéx ^w dəx ^w -cáč	təbáx ^w -s spéx ^w -as ~ spēx ^w -s dəx ^w -cáč-s		gooseberry gull tongue

Fig. 21.--Affix Truncation (Possessive)

In the development of the rules for vowel-loss under different stress conditions, we examined the behavior of the derivational vocalic suffix (-ayh, 'growing thing, plant'). We now compare the behavior of a grammatical vocalic suffix; a simple example is that of the third singular possessive suffix -as.

Consider Figure 21. Comparing ʔásax^w ; ʔásax^w -s 'seal' with s- $\text{tá}^w\text{táq}$; *s- $\text{tá}^w\text{táq}$ -y 'thimble-berry bush', we see that the derivative noun follows the vowel-loss rule (Chap. II, sec. 16), whereas the noun with possessive suffix truncates the suffix but does not also lose the second stem vowel. We thus assume that in ʔásax^w -as, ʔásax^w keeps its autonomy as a di-syllabic, i.e., must be considered to be followed by 'word-boundary': while *s- $\text{tá}^w\text{táq}$ -ay¹ behaves as a single phonological unit (e.g., 'word').

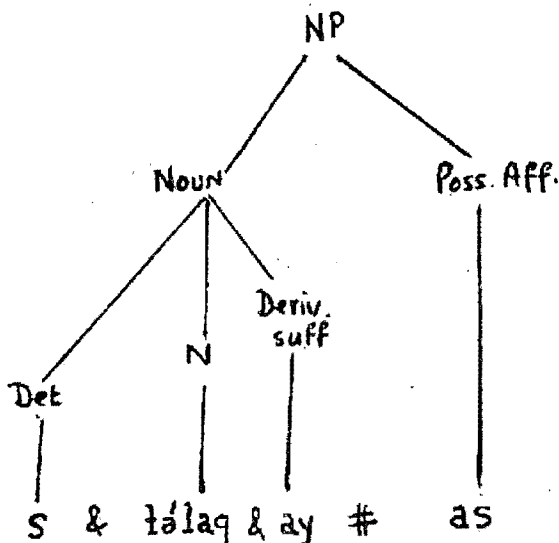


Fig. 22.--Surface Structure for 'his berry-bush'

Having established 'possessive' as a potentially-truncating suffix, we may consider the proper form for the truncation rule required.

From sub-corpora (a) to (d) above, it is seen that truncation occurs when the last two segments are unstressed. Thus s-k^wól-as 'his school' : but s-x^wák^wk^w-s 'his breath,' q^wéle-s 'his cedar tree,' and s-láday-s 'his woman.'

¹ Compare Fig. 18 (Chap. II, sec. 12.3) for typical derivatives.

However, taking sub-corpus (e), we find this simple formulation apparently contradicted. The form (e.g.) $s-q^w\text{bá?y-as}$ 'his dog' should, on the above segment-counting criterion show a truncated suffix ($**s-q^w\text{bá?y-s}$, then $**s-q^w\text{bá?es}$, by semi-vowel rule). At first sight, it might appear that glottal-stop absorption has in fact applied to stem-final voiced segments; and that would certainly enable these forms to satisfy the segment-counting rule. On the other hand, such an assumption would largely destroy the power of the rule for glottal-stop deletion,¹ for a form like that for 'coal' would now be čalád-as , and we should thus be obliged to constrain the ?-deletion rule so that it does not delete ? on final voiced obstruents.

For the moment, we should prefer not to abandon the position we have taken on the derivation of glottal stops; in particular, we should still wish to hold that glottal stops are generated in association with m/n,² and that these glottal stops are absorbed, and then lost when m/n change their obstruency.³

In the circumstances, the simplest solution to the problem of forms such as $s-q^w\text{bá?y-as}$, with no affix-truncation, is to assume that the environment 'non-obstruent plus glottal stop' is idiosyncratic.⁴ From the point of view of rule-format, there seem little motivation for expressing this exclusion in any other way than in words, as a rider to the rule.

Affix-truncation:

$\begin{matrix} [-\text{cons}] \\ [+v\text{oc}] \end{matrix} \longrightarrow \emptyset \text{ in env. } / \begin{matrix} [-\text{stress}] \\ [-\text{stress}] \end{matrix} \quad \# - \text{Affix}^5$
 (but not $\begin{matrix} [+v\text{oice}] \\ [?] \end{matrix}$)

¹We recall, that we asserted that the implication of that rule was that once m/n had become obstruents they could no longer also be glottalized. It is this generalization that, both for the present grammar and for its historical implication, we wish to preserve.

²As well as with l, w, y.

³The alternative positions, that the change of obstruency has changed dictionary entries, or that it occurs in the grammar but before the generation of glottal stops by vowel-loss, are discussed at length above (Chap. II, sec. 8 end); we there preferred to hold the present view, since (for example) it also handles otherwise inexplicable cases such as bóle- ; bál-bóle , dšwat ; do-dšwat .

⁴A possible interpretation of the so-called 'idiosyncrasy' has to do with the identification of glottal stop as itself a semi-vowel. We discuss this further (Chap. II, sec. 18).

⁵We hold the specification of ? for the moment (see Chap. II,

It remains to explain the apparently anomalous forms of sub-corpus (f), where the affix is apparently truncated with only one consonant between it and the stressed vowel.

Instead of marking these forms as 'exceptional' to the affix-truncation rule, we shall hold that there are indeed two consonants stem-finally. For 'gooseberry' and 'gull' there are at first sight two possibilities. We could assume that the final x^w is in fact a cluster hw, which would not differ auditorily from x^w .¹ But it will be seen² that *h* exerts a lowering effect on stressed *e* or shwa, an effect not found in these forms. The second possibility is that we have to do with xw.

One of the few stable sound-changes inside Salish is that of *k* to \check{c} , with the parallel *x* to \check{s} . Equally to the point, however, is the fact that the parallel rounded segments k^w and x^w did not partake of this palatalization. What we are thus suggesting in effect is that the cluster *x* plus *w* constitutes a relic environment for the survival of original Salish *x*.³

What, however, can be said of $d\check{x}^w-c\check{a}\check{c}\check{s}$, where we have no obvious choice of re-interpretation as we had for the other two cases? If the above argument is correct, then here too, we ought to be able to assume a two-segment unstressed environment finally. It will be seen from the discussion on *h*-loss (Chap. II, sec. 15.3), that the most plausible candidate for the 'lost' segment in $d\check{x}^w-c\check{a}\check{c}\check{s}$ is perhaps -*h*-. We thus tentatively re-construct $*d\check{x}^w-c\check{a}\check{h}\check{c}$ (or $*d\check{x}^w-c\check{s}\check{h}\check{c}$) for 'tongue.'

We have now established that the grammatical affix 'possessive' behaves differently from a derivational affix such as **-ayh*, 'growing thing,' in that the former truncates by a rule directly relating to the position of the stress in the stem, and have mentioned briefly the implications

sec. 18). For fuller specification of Affix-Truncation, see Chap. II, sec. 15.4, where ordering is also dealt with.

¹ In Twana, x^w commonly shows very little friction (as compared to x^w), and is often indistinguishable auditorily from *hw* (or h^w).

² Chapter II, sec. 15.3.

³ We distinguish original x^w from this by pointing to forms such as $x^w\check{s}$ 'tired,' $x^w\check{a}d-x^w\check{s}$ 'all tired,' where the reduplication shows that x^w is treated as one segment. See also Chap. IV, sec. 3.5, on *k* - \check{c} , *x* - \check{s} .

for the Phonological Cycle. Equally important, at least from the point of view of the following discussion, is the behavior of the glottal stop when stem-final (e.g., sq^wəbáyʔ-) in conjunction with a preceding non-obstruent. We proceed now to compare with this the behavior of stem-final h, again making use of the 'truncating' possessive affix.

II.15.3. Laryngeal Affection

II.15.3.1. By h

Non-Poss.	3rd Sg. Poss.	1st Pl. Poss.	Gloss
seʔəh ~ seʔəʔ ~ seʔə	seʔəh-as ~ seʔəh-ás	seʔə-ɪ	house ¹
ɬeʔəh ~ ɬeʔəʔ ~ ɬeʔə	ɬeʔəh-as ~ ɬeʔəh-ás	ɬeʔə-ɪ	thing here ¹
dəcəh ~ dəcəʔ ~ dəcə			I
bədəh ~ bədə	bəd-as	bədə-ɪ	child
sələh ~ sələ	səl-as	səla-ɪ	grandfather
məʔəh ~ məʔə	məʔ-as	məʔə-ɪ	dad
kəʔəh ~ kəʔə	kəʔ-as	kəʔə-ɪ	mother
kəyəh ~ kəyə	kəyə-as	kəyə-ɪ	grandmother
qəʔələh ~ qəʔələ	qəʔəl-as	qəʔələ-ɪ	loon ²
dəhədəh ~ dəhədə	dəhəd-as	dəhədə-ɪ	clothes
bəlálg ^w əh ~ bəlálg ^w ə	bəlálg ^w -as	bəlálg ^w ə-ɪ	navel
yəx ^w ələh ~ yəx ^w ələ	yəx ^w əl-as	yəx ^w ələ-ɪ	hawk
yéʔyastəh ~ yéʔ-yastə	yéʔ-yastəhe-s	-	wild rose ³

Fig. 23.-- h- Affection

¹For the stress alternation, see Chap. II, sec. 15.6.

²See Chap. II, sec. 8 for d- alternants.

³See Chap. II, sec. 15.3.1 end.

Considering the forms of Figure 23, the following rule obtains for the unmarked forms: 'Utterance-final h (optionally) alternates with glottal stop or zero after a stressed shwa, and with zero after an unstressed shwa.'

For the cases of stressed shwa in the final syllable, the forms for third singular show the allomorph of 'possessive' that we expect, viz., -as. However, the first plural forms show two irregularities; shwa here gives a, and h is lost. Since the first plural morpheme in Twana is everywhere else simple -i, and never -Vi, we do not feel justified in assuming an allomorph here, and thus cannot assume the source of the a-vowel to lie in some kind of vowel-coalescence. It is therefore held that -h exercises a lowering influence on the preceding stressed shwa before being lost. Call such an effect 'h-affection.'

What are the precise conditions for this 'h-affection' of vowels, and for the loss of -h thereafter? Since we must assume the forms underlying the alternants (e.g.) bádəh ~ báda to contain final -h, we may certainly suggest that the diverse outputs for third singular as between seʔəh; seʔəh-as and bádəh; bád-as¹ are attributable to the presence or absence (respectively) of stress on the final vowel.

Restoring the h throughout these paradigms for representative forms, we have:

seʔəh	seʔəh-as	seʔəh-i
teʔəh	teʔəh-as	teʔəh-i
bádəh	bádəh-as	bádəh-i
séləh	séləh-as	séləh-i
káʔəh	káʔəh-as	káʔəh-i

Compare the forms for third singular with those for first plural. Note first that h-affection may occur regardless of the stressing of the stem-final vowel; all the forms of the first plural show it. Second, h-affection is apparent for those (and only those) forms of the third singular which meet the condition for suffix-truncation, viz., where the stress is not on the last syllable. On the other hand, h-loss occurs in the present corpus only when h is followed by a consonant, that is, when suffix-truncation has already operated.

The following ordered rules capture the above generalization:

¹As in Figure 23, so here in the text such forms are, of course, wrongly divided, for reasons of exposition. The proper division is (e.g.) báda-s.

1. Truncate the initial vowel of a grammatical suffix if the stress conditions are met (see p. 88).

2. Lower a shwa to a, when followed by -hC.

3. Delete h before a consonant.¹ Word-final h is optionally replaced (only) by zero after an unstressed vowel.

We show now the derivation of *seʔsh* 'house' and *bədəh* 'child' by the above three rules.

'house' 3 sg. poss:

s-eʔsh-as gives *s-eʔsh-as* (Rules 1-3 not applicable)

1 pl. poss:

s-eʔsh-i gives *s-eʔsh-i* (Rule 2), then *s-eʔá-i* (Rule 3)

unmarked:

s-eʔ-áh gives *s-eʔáhs-eʔáʔ ~ s-eʔá* (Rule 3).

'child' 3 sg. poss:

bədəh-as gives *bədəh-s* (Rule 1), then *bədəh-s* (Rule 2)
then *bədə-s* (Rule 3).

1 pl. poss:

bədəh-i gives *bədəh-i* (Rule 2), then *bədə-i* (Rule 3).

unmarked:

bədəh gives *~bədə* (Rule 3).

The form *yéʔ-yəstəh-e-s* 'his wild-rose bush' is, finally, derived as follows: **yéʔe-yəstəh-ay+as*, then *yéʔe-yəstəh-ay+š* (truncation of affix), then *yéʔ-ystəh-y+š* (vowel-losses),² then *yéʔ-ystəh-e+š* (semi-vowel rule),³ and finally *yéʔ-yəstəh-e+s* (shwa-insertion).

¹There must be an option on this rule. Compare *seʔsh* : but *bə-č-seʔ-áh-čəd* alternating with *bə-č-seʔá-čəd* 'I'm building a house.' This option is probably limited to cases with following [-Cont] segments.

²For the treatment of unstressed vowels in the environment *ŷʔ-*, *-ŷʔ*, see Chap. II, sec. 17.2. For the vocalisms and the constituent structure of Attenuative, see Chap. III, sec. 3. Note also that the stem-final shwa before *h* is not lost (see Chap. II, sec. 11), so that *h* remains.

³As will be confirmed from the Attenuative, stem-initial semi-vowels do not vocalize (cp. Chap. III, sec. 3).

11.15.3.2. By?

	<u>Non-Poss.</u>	<u>3rd Sg. Poss.</u>	<u>Miscellaneous</u>	<u>Gloss</u>
			báda-t	our child
<u>ah</u>	seʔáh	seʔáh-as	seʔá-t	house, his, our
<u>eh</u>	hələ(h)	sələh-as	ʔasələ-hále-t	alive, his life, we're alive
<u>oh</u>	heʔódax ^w		heʔódax ^w	he was coming, he came
	las-heʔó-čad } ~ las-heʔóh-čad }			I'll come ¹
<u>a?</u>	dəsədəʔ	sədəʔas	sədəʔləp	mine, his, your(pl.)
<u>e?</u>	skələʔ	skələʔas		anus, his
	s-tčəʔ		s-tč-tčə	island, islands
	sqələʔ		s-qəʔe-qəle	monster, animal ²
<u>a?</u>	xaxáʔ	xaxáʔas		taboo, his holiness
<u>o?</u>	qʔʔ	qʔʔas		water, his water
	sʔeyóʔ		s-ʔeyəʔəyo	remedy, remedies
	ʔas-q ^w sóʔdax ^w		ʔas-q ^w s-q ^w əso	strung, all strung ³

Fig. 24.--ʔ- Affection

¹ - future particle, plus -s- nominal.² (Under 'Miscellaneous') An Attenuative formation (see Chap. III, sec.3).³ Probably *q^wəsoh.

It was seen above that stem-final h lowers a preceding stressed shwa. Moreover, limited though the data is, there is good reason to suppose that not only does h have a similar effect on the other vowels, but that glottal stop has a parallel effect.

The crucial forms for the presence of stem-final h are those (such as 'possessive' third singular) in which a vowel-initial affix follows. Figure 24 shows that h-infection occurs with stressed e and o just as with stressed shwa, but that for the former the environmental condition 'with a following consonant' is not necessary.

It is equally clear from this corpus that glottal stop has the same lowering effect as has h. For shwa forms (e.g. sə-dáʔ-as 'his,' but sə-dáʔ-ləp 'belonging to ye') the 'following consonant' is again required. On the other hand, s-kaléʔ-as 'his anus,' etc., show that for non-shwa forms, glottal stop requires no following consonant to produce what we have so far called 'h-affection' on a stressed vowel.

By analogy from the above argument, we shall assume that forms such as qʔʔas 'his water' have the underlying shape qʔʔ; it is clear from the third singular possessive forms that the stem-final consonant in such forms must be glottal stop and not h.

Additional support for what we must clearly re-name, more generally, as 'laryngeal affection' is found in the few relevant attested contrasts between (unmarked) completive and (marked) derived incompleted. We assign to 'derived incompleted' the phonological spelling 'h', and are thus able to account for such a contrast as that between heʔódax^w 'come in,' 'he came,' and heʔódax^w 'he was coming along.' The latter is underlyingly *heʔó-h-dx^w.

II.15.4. h-Mutation

	<u>Unaugmented</u>	<u>Augmented</u>	<u>Gloss</u>
(a)	wədáwʔ	wəd-ʔwədáw	horn
	táwʔ	tóʔ-táw	mussel
	ʔəs-tqáwʔ	ʔəs-qtqáw	patched
	ʔəláyʔ	ʔəlʔ-ʔəláy	shovel-nosed canoe
	<u>Non-Attenuative</u>	<u>Attenuative</u>	
	pəwáyʔ	péʔəpəwe ¹	flounder ¹
	s-q ^w əbáyʔ	s-q ^w éʔəq ^w əbe	dog
	<u>Unaugmented</u>	<u>Augmented</u>	
(b)	šáwʔ	šoʔ-šáwʔ	bone
	qəlwayʔ	qəlʔ-qəlwayʔ	crippled
	s-q ^w óbáyʔ	s-q ^w əb-q ^w óbáyʔ	brain

Fig. 25.--h-Mutation

¹No augmented form is attested for pəwáyʔ 'flounder.' For s-q^wəbáyʔ 'dog,' the attested plural is s-q^wəbəʔy-óbəʔ, -óbəʔ being always an alternative plural-marker to the reduplication we have discussed. Since the point at issue is, whether or not the glottal stop appears despite retraction of stress, the use of these 'Attenuative' forms here is quite legitimate. For Attenuative formation, see Chap. III, sec. 3.

Passing reference has been made to the alternation $\text{ʔ}/\text{h}$ (Chap. II, sec. 3 [end]) exemplified by the form $\text{wədáw}^{\text{ʔ}}$; wəd-ʔwədaw . Figure 25 draws together a number of examples of this phenomenon.

Compare first $\text{s-q}^{\text{w}}\text{ábáy}^{\text{ʔ}}$; $\text{s-q}^{\text{w}}\text{é}^{\text{ʔ}}\text{e-q}^{\text{w}}\text{əbe}$ (attenuative) 'dog.' Reconstructing the Attenuative form from our understanding of the vowel-loss rules, we recover $\text{*s-q}^{\text{w}}\text{é}^{\text{ʔ}}\text{e-q}^{\text{w}}\text{bay}^{\text{ʔ}}$ then derive $\text{s-q}^{\text{w}}\text{é}^{\text{ʔ}}\text{e-q}^{\text{w}}\text{by}^{\text{ʔ}}$ (vowel loss), then $\text{s-q}^{\text{w}}\text{é}^{\text{ʔ}}\text{e-q}^{\text{w}}\text{be}^{\text{ʔ}}$ (semi-vowel rule), then $\text{s-q}^{\text{w}}\text{é}^{\text{ʔ}}\text{e-q}^{\text{w}}\text{əbe}$. Now we may not suggest that the loss of the final glottal stop results from remoteness of stress in the derived form; for then, why does $\text{s-q}^{\text{w}}\text{əb-q}^{\text{w}}\text{óbáy}^{\text{ʔ}}$ 'brain' retain its glottal stop in the augment? Adding to this the fact that $\text{táw}^{\text{ʔ}}$ 'mussel' loses its glottal stop in augment ($\text{tə}^{\text{ʔ}}\text{-táw}$), while $\text{śáw}^{\text{ʔ}}$ 'bone' retains its ($\text{šo}^{\text{ʔ}}\text{-śáw}^{\text{ʔ}}$), it is clear that something other than stress is involved.

We recall that $-\text{h}$ freely alternates with glottal stop (and with zero) finally after a stressed vowel, and now suggest that the respective underlying forms for 'dog' as against 'brain' must be reconstructed as follows. For 'dog,' with loss of glottal stop in Attenuative, $\text{*s-q}^{\text{w}}\text{ábáyh}$; but for 'brain,' which retains glottal stop in Augment, $\text{*s-q}^{\text{w}}\text{óbáy}^{\text{ʔ}}$. That is, we propose that glottal stop which alternates with zero is derived from final h in a cluster, while non-alternating glottal stop is 'original.'

The rule required for the forms concerned must provide for h becoming ʔ finally after a semi-vowel, provided a stressed vowel precedes the cluster. The case of $\text{táw}^{\text{ʔ}}$; $\text{tə}^{\text{ʔ}}\text{-táw}$ 'mussel' shows that the alternation with zero must also be allowed for, just as with simple (i.e., non-clustering) h -final after a stressed vowel.

The ordering of the rule for deriving ʔ from final h as explicated above is clear; since the glottal-attraction rule is to operate on the output from the string (e.g. $\text{*s-q}^{\text{w}}\text{ábáyh-as}$), shapes such as $\text{s-q}^{\text{w}}\text{ábáy}^{\text{ʔ}}\text{-as}$ must be presented to it, for we get $\text{s-q}^{\text{w}}\text{ábáy}^{\text{ʔ}}\text{-as}$. On the other hand, the rule for suffix truncation must itself be very slightly modified now to enable it to handle forms such as the present $\text{*s-q}^{\text{w}}\text{ábáyh-as}$ as well as $\text{*śáw}^{\text{ʔ}}\text{-as}$. The amendment will consist, simply, of adding 'or h' to the rider expressing the exclusion environments.¹

The rules newly discussed are thus as follows:

¹See p. 88. See Chap. II, sec. 18 'Specification of $\text{ʔ}/\text{h}$.' We shall at length specify simply 'laryngeal.'

1. Allix truncation, before laryngeal affection : *bádəh-as → bádəh-s
2. Laryngeal affection : bádəh-s → bádəh-s
3. h optionally gives { $\frac{?}{\emptyset}$ } finally after a stressed vowel

$$\begin{cases} d\acute{a}c\acute{a}h \sim \\ d\acute{a}c\acute{a}h \sim \\ d\acute{a}c\acute{a} \end{cases}$$
- h optionally gives { $\frac{?}{\emptyset}$ } finally after \bar{V} plus semi-vowel

$$\begin{aligned} &*w\acute{a}d\acute{a}wh \\ &\rightarrow w\acute{a}d\acute{a}w? \\ &*to?-\acute{t}\acute{a}wh \\ &\rightarrow to?-\acute{t}\acute{a}w \end{aligned}$$
- h^1 is deleted finally after an unstressed V plus semi-vowel

$$w\acute{a}d-\acute{t}w\acute{a}d\acute{a}w$$
- h is optionally deleted finally after an unstressed vowel

$$\begin{cases} b\acute{a}d\acute{a}h \sim \\ b\acute{a}d\acute{a} \end{cases}$$
- glottal stop is deleted after an unstressed vowel

$$s-\acute{t}\acute{c}-\acute{t}\acute{a}\acute{c}\acute{e}$$
- h is optionally deleted before a consonant

$$\begin{cases} \acute{t}-\acute{a}s-he\acute{t}\acute{a}h-\acute{c}\acute{a}d \sim \\ \acute{t}-\acute{a}s-he\acute{t}\acute{a}-\acute{c}\acute{a}d \end{cases}$$
4. Glottal attraction

$$sq^w\acute{a}b\acute{a}l\acute{y}as$$

II.15.5. Vowel Assimilation

We note from forms in Figure 24 and Figure 26(a) that in the presence of a laryngeally-affected vowel, the possessive morpheme -as assimilates its vowel to the affected vowel. Figure 26(b) adds a further sample of forms, from which we conclude that what we shall now call 'vowel-assimilation'² is a phenomenon not at all confined to 'possessive' but of wide-spread occurrence in Twana, in phonologically-definable environments. The following rule conveys the notion simply. Notice that the rule proposed must follow that for laryngeal affection, since it must operate on the products of that rule.³

Vowel-Assimilation:

$$\begin{bmatrix} +voc \\ -cons \\ -stress \end{bmatrix} \rightarrow \text{copy of V in env.} / \begin{matrix} 1 \left\{ \begin{matrix} - \\ \left[\begin{matrix} +voc \\ -cons \\ +stress \end{matrix} \right] \end{matrix} \right\} \\ 2 \left\{ \begin{matrix} +voc \\ -cons \\ +stress \end{matrix} \right\} \end{matrix} \begin{matrix} 1 \left\{ \begin{matrix} +voc \\ -cons \\ +stress \end{matrix} \right\} \\ 2 \left\{ \begin{matrix} - \\ - \\ - \end{matrix} \right\} \end{matrix}$$

(Condition: V is not ?)

¹Ordering of these sub-rules is so far not crucial--they may be much later.

²Assimilation, not 'harmony.' Clearly, we do not have to do with a feature of morphemes; the rule is stateable in terms of local influence on segments. Cf. Kiparsky (1968).

³For instance, if *s-kalé?-as first underwent vowel-assimilation, we should get s-kalé?es; laryngeal-affection would then give **s-kalé?es, and we should require another rule to give the vowel-adjustment for s-kalé'ee.

	Example		Gloss
(a)			
Compare	dəsədəʔ		it's mine
	ʔəsədəʔ		it's thine
	sədəʔ-as ¹ ~ sədəʔ-ás		it's his ¹
	dəsədəʔ-óbəš ~ dəsədoʔ-óbəš		they're mine
	ʔəsədəʔ-óbəš ~ ʔəsədoʔ-óbəš		they're thine
	sədəʔ-óbəš-s ~ sədoʔ-óbəš-s		they're his
<hr/>			
(b)			
Compare	čəʔəd !	wet it!	s-čəʔéwəd
	ʔéwəd	inside	
Compare	čəč	across	dəx ^w -ʔaʔáʔes-a-bəd
	ččáyas	eye-brow ³	
	ʔəʔəʔdəx ^w	search!	
Compare	sk ^w ól	school	s-k ^w ól-as
	skələʔ	anus	s-kələʔes } ~
	spəlweʔ	swan(?)	s-kələʔes } ~
	hələ	alive	spəlweʔes } ~
			sələhes } ~
Compare	čəwáš-ab	got be-wived	s-péʔx ^w -aɪ-
	hələh-ab	got well	
	hələh-áb		
Compare	s-péx ^w	gull	wehəʔw-aɪ
	wəhəʔ	owl	
Compare	qəʔ	water	~ { qəʔs- təyabéd
	həhəʔ	lots	

Fig. 26.--Vowel Assimilation

¹ Compare seʔəh-as ~ seʔəh-ás 'house, his house.' But a stress-less suffix vowel does not assimilate to stem ə. Cf. Tense-Lax, Chap. IV, sec. 4.4.

² Cf. čəʔ-éq^wədəb 'wet your head' (-éq^wad 'head'): but čəʔ-áčəb 'wet you hand' (-áčə(h) 'hand.')

³ čəč 'across'; -áyas 'round object' suffix.

⁴ dəx^w--bəd Instrumental derivation, *nx^w--mn, thus *nx^w-ʔəʔ-áyas-mn.

⁵ For stress shift, see Chap. II, sec. 15.6.

⁶ Genitival construction *qəʔ-as t-ə-yamén 'water-of fruit.'

II.15.6. Stress Shift to Affix

A further alternation is illustrated by the forms of Figure 26. This is the alternation in the position of the stress between the last vowel of the stem, and the initial vowel of suffixes such as -as 'possessive,' -ab 'verbalizer.'

The occurrence of forms such as $se^{\text{?}}h\text{-}\underline{a}s$ 'his house' \sim $se^{\text{?}}\underline{a}h\text{-}as$, demonstrates that the alternation is not limited to stems with [+compact] vowels; on the other hand, it is limited to forms containing h/? as stem-final consonant.

Could a rule providing for this optional stress-shift in fact operate on the converse situation, i.e., could it be assumed that the suffixes concerned are in fact stressed, and that the optional stress-shift then puts the stress on the stem vowel? Clearly not, since for e/o stems 'laryngeal-affection' requires a stressed vowel, and the latter rule is not optional. Thus the rule for optional stress-shift follows that for 'laryngeal-affection.'

A further question is that of the interpretation of the alternates with unstressed a (as $se^{\text{?}}\underline{a}h\text{-}\underline{a}s$), in the case that the stress-shift option has been taken. Recall that in di-syllabics with stress on the second syllable it was found expedient to assume a preceding (and unstressed) shwa is always lost; in certain definable conditions, a shwa would then later be inserted. It will be shown,¹ in connection with ?/h-initial stems, that any unstressed vowel before ?/h preceding a stressed vowel is optionally lost.

II.15.7. C-h Metathesis

Another aspect of the behavior of h is illustrated by the forms of Figure 27. Here the cluster $\text{-}\check{V}hC$ is in free(?) variation with $\text{-}\check{V}C$: we hear $q\acute{a}hse(h) \sim q\acute{a}se(h)$. First, this variation is found in a number of forms, but never found in others; it is thus difficult to dismiss the phenomenon as 'sporadic intrusive h.'

Much more important than this is the fact that for the few attested augmented forms corresponding to $\text{-}\check{V}hC$ stems, we find that the reduplication

¹See Chap. II, sec. 17.2.

<u>h-Form</u>		<u>Non-h Form</u>	<u>Gloss</u>
báhc̣ad	~	bácad	shag
q ^w əláhq	~	q ^w əláq	late
s-páhq ^w at	~	s-péq ^w at	waterfall
xáhčəb-čəd	~	xáčəb-čəd	I gather wood
cáhpə(h)	~	cápe(h)	daughter-in-law
dáhqas	~	dáqas ~ dəqas	one
qáhse(h)	~	qáse(h) : pl. qs-qáhse(h)	uncle
čáhtas	~	čátas : pl. čt-čáhtas	stone
s-táhkəd	~	s-tákəd } : pl. s-k-tákəd ~ s-tákəd }	stocking
čə ^w áht	~	čə ^w át	fine

Fig. 27.--C-h Metathesis.

apparently takes no account of the h segment. We get qáhse(h) ~ qáse(h) but only (augmented) qs-qáhse(h) ~ qs-qáse(h); never **qah-qáhse(h) or **qa-qáhse(h), etc.

It is, of course, open to us to modify the reduplication rule to allow for such forms; that is, we could say that 'reduplication consists of CV(h)C'.¹ This is certainly better than marking the individual forms in the dictionary as having allomorphs of the shape (e.g.) [qáhse(h); qáse(h) (Augment)].

However, recalling that a glottal stop is attracted by the stress, and that in other respects h behaves in parallel fashion to glottal stop, we could now suggest that h is likewise 'attractable' by the stress. We might then propose that forms like qáhse(h); qs-qáhse(h) in fact derive from underlying forms of the shape C^vCh- and then show h-metathesis in the stressed syllable of the stem itself, while the reduplication shows simply the regular CVC structure we have so far assumed for the Augment.²

¹ It being understood that the h would be lost in the resultant cluster qhs-.

² This is perhaps related to the problem of 'lost x' in Twana. Compare Elmendorf's Inventory (Chap. I, sec. 3.3.2), and see also Chap. IV, sec. 4.2 for an alternative explanation (fn.3 on p.214).

How, now, are we to account for variations such as dáhqas ~ dáqas ~ dáqas, etc.? First, it can be shown that in certain of these forms, the underlying stressed vowel cannot be a : such a form is s-páhq^wat,¹ where the a vowel must then be attributed to 'laryngeal affection.' With this in mind, we may well suggest that the alternation a ~ a must result from an option in the rule for h-attraction.² If, as is clear from the corpus, the h-loss rule is also optional, then it follows that: (1) if h is metathesized we get dáhqas; with (optional) h-loss, dáqas; while (2) if h is not metathesized we get only dáqas.³

It is now clear that, despite the parallelism between the behavior of h and glottal stop, the h-metathesis rule cannot be incorporated together with the glottal-attraction rule into a single ʔ/h attraction rule. h-metathesis precedes laryngeal-affection, vowel-harmony, and optional stress-shift; while glottal-attraction cannot operate until the stress-shift option has been taken (or not), whereupon the vowel-loss rule will produce certain glottal-stops⁴ then to be attracted.

II.15.8. The Derivation of 'One by One'

As was seen above the underlying form for 'one' must be *dáhqas. However, the Distributive 'one by one' is dáqs: how can this be derived from *dáhqas if the constituent structure of Distributive is, as we have shown,⁵ CVC-VC plus stem? If we attempt to reconstruct using *dáhqas, we get **dáhq-ásq-has, from which it is impossible to derive the correct output.

¹See Attenuative. It is clear that s-páhq^wat 'small waterfall' can only derive from *s-páhq^wat. *s-páhq^wat would give *s-páhq^wat

²This parallels to some extent the option we have already noted on the glottal-attraction rule (e.g.) in word-final position. Compare čaláʔd ~ čaládʔ 'coal.'

³The implication, of course, is that *dáhqas is the proper underlying form for 'one.'

⁴We recall that the vowel-loss rule proceeds by 'counting' the vowels following the stress.

⁵See Chap. II, sec. 14. We are, of course, at liberty to assert that 'one by one' is simply (suppletively) dáqs, with appropriate dictionary marking. It is, of course, clear, on the other hand, that we cannot derive (surface) dáqs from *dáhqas.

Consideration of the vowel in dáqs, however, suggests a solution.

Clearly the original ə has undergone h- affection; we therefore reconstruct the first three segments as *dáh-. Now if this must stand as the initial CVC for the underlying form, then that underlying form must have the shape *dáhqas.

If, now, we reconstruct the total underlying Distributive form, we have *dáh-əh-qas. The shwa in the unstressed syllable before the stress will be lost, giving dh-əh-qas. This, too, is incorrect. We recall, however, that there is an optional stress shift (compare čəʔəʔs ~ čəʔəʔs 'three by three') from the infix to the initial syllable.¹ Such a stress shift parallels the shift described in connection with suffixes (Chap. II, sec. 15.6). Let us assume that, like that rule, the present stress-shift operates before the vowel-loss rule. We then set up *dáh-əh-qas, which gives dáh-əh-qas (h-affection), then dáh-əh-qas (vowel-assimilation), then dáh-ah-qas (optional stress shift), then dáh-h-qas (vowel-loss) and finally dáqs (h-loss).

No contradiction is involved, of course, in deriving the cardinal 'one' from *dəqhas, but the distributive from *dáhqas, for these are simply examples of allomorphy in the dictionary.²

II.15.9. h and the Unvoicing of l

	<u>l-Forms</u>	<u>ɬ-Forms</u>	<u>Gloss</u>
(a)	ʔélal-dəx ^w		sang ¹
	q ^w ál-dəx ^w		painted
	čépál-dəx ^w		afraid
	ɬaqél-dəx ^w		many sitting ²
	ʔosél-dəx ^w		dived
	čél-dəx ^w		lazy
	q ^w ól-dəx ^w		filled
	sk ^w ól		school ³

¹ Cf. also ʔóp-op-ədəčs, 'ten by ten,' Chap. II, sec. 14.

² Note that we are unable to utilize the rule for metathesis to solve the distributive dáqs, since the C.S. rule would give us **dəq-əq-has. It is precisely the notion that dáh-əh is supplied by the C.S. rule, that is recaptured by the use of dictionary allomorphy. 'Distributive' simply selects dáhqas.

<u>1-Forms</u>	<u>1-Forms</u>	<u>Gloss</u>
x ^w 1-dəx ^w		gathered
q ^w 1-dəx ^w		cooked
(b) s-1ók ^w ələb	1ók ^w əl	moon; sun ⁴
1q ^w ədálad	1q ^w ədál	grave-yard; ghost ⁵
1q ^w ədál-əbəʒ		ghosts
ʔopál-ab	ʔopál1dax ^w	one eats it; eat it!
dəx ^w -ʔácəwəl-bəd	ʔacáwəl1dax ^w	vehicle; on board
dəx ^w -xqəʔwél-bəd	bə-xqəʔwél	landing-place; landing
ʔəs-əbədólatab	bədól	it's festering; pus
bəfá cəwəl-əb-st	ʔácado1	made s'one pregnant; pregnant ⁶
1əʔwálbəd	1əʔwál1dax ^w	a legacy; left him
(c) ʔəsólab-dəx ^w		he takes him ('goes him')
ʔəsól-dəx ^w	ʔəsól1dax ^w	he took it; go! ⁷
(d) ʔəsóldax ^w		it was taken
ʔəsól1dax ^w		go now!
sólʔ		going to (a place)
s-1ók ^w ələb		moonlight
1ók ^w əl		moon
ʔas-k ^w əlʔ		sunshine

Fig. 28.--h - Unvoicing of l

¹dx^w. Completive suffix. Homonymous with 'unmarked' Imperative.

²1aqél. Suppletive collective plural stem 'many sit.' Compare ʔabót-dəx^w 'he sat down.'

³s-k^wól 'school.' A loan from English, with characteristic labialization of k before or after o. Compare bók^w 'book.'

⁴The exact relation between 1ók^wəl-əb (apparently a derived intransitive) and 1ók^wəl is not clear. Also unclear is the relation of these to ʔas-k^wəlʔ 'sunshine.'

⁵The suffix -d (lost before 1) makes derived nouns. The vocalism is rarely present, and it is not clear whether -d is reduced from -ad or is another suffix.

⁶The 1-form is derived intransitive (-b), causative (-st-).

⁷The relation here is explained in the text. But the relation of

Fig. 28--cont.

these (if indeed they are related) with $sólʔ$ 'going' is obscure. Compare $ʔas-k^w sɪʔ$ in footnote 4 above. If $sólʔ$ is connected with $ʔəsól-dəx^w$, then we must of course re-write the latter as $*ʔas-sól-dx^w$.

Figure 28 cites forms in which \underline{l} alternates with its voiceless counterpart $\underline{ɬ}$.

Sub-corpus (a) gives a small sample of forms for which no $l \sim ɬ$ alternation is attested. Sub-corpus (b), on the other hand, shows that the alternation between certain parts of the total word-paradigms involves $l \sim ɬ$. We recall the distinction made above (Chap. II, sec. 15.4) between 'original' glottal stop and glottal stop deriving from h in certain clusters finally: after a voiced semi-vowel (w, y), h gave glottal stop in such forms as $wədáwʔ$ 'horn' and $pəwáyʔ$ 'flounder.' We now propose that the forms in the right-hand column of sub-corpus (b) in fact contain \underline{h} , and to interpret the alternation $l \sim ɬ$ as arising from the operation of a rule by which l assimilates its voice to that of a following semi-vowel (h).¹

What, then, is the domain of such an assimilation rule? Note that the forms of the left column in sub-corpus (b) all contain \underline{l} in non-final position; on the other hand, some of those of the right-hand column contain final \underline{l} but some do not. From the Notes to the corpus, however, it will be seen that the left-hand column consists of forms in which the hypothesized -lh cluster is not stem-final; conversely, those of the right-hand column all contain stem-final lh. The domain of the rule for h -assimilation is thus clearly that span bounded by whatever marker suitably characterizes 'stem-final.'

The forms so far cited clearly show the environmental contrast by

¹The one form in the total corpus where the alternation $l \sim ɬ$ is patently attributable to the presence of -h- is, unhappily, a form which we are unable to explain fully. This is $ʔas-hə-hái-čəd$ 'I'm happy.' If, as seems likely, this form has the same root ($*həléh$) as we find in $həléh-čəd$ 'I'm alive,' then we may reconstruct the shape $*ʔas-hə-həléh-čəd$, a Stative which follows the 'intensive' derivation. But we are unable to account for the stress-shift and vowel-loss which would give us the derivation-stage $*ʔas-hə-həl-h-čəd$ from which the $ɬ$ -form must arise.

It is possible that $q^w élo$ ($*q^w éloh$?) 'cedar bark,' and $q^w éɬəy \sim q^w éɬəy$ ($*q^w éloh-ay$??) 'leaf' are also examples of the $l \sim ɬ$ alternation (Chap. II, sec. 15.9).

means of which they are to be distinguished by the (h) voice-assimilation rule. The forms of sub-corpus (c), however, seem to contradict this formulation. We thus assume that they are not to be considered as precisely parallel to the forms of sub-corpus (b). What, then, is the difference?

We recall that the distinction between (e.g.) $he^{16}dax^w$ 'he was coming' and $he^{16}dax^w$ 'come on!' was attributed to the presence in the former of the constituent 'derived incomplete,' to which we assigned the phonological spelling $-h$.¹ It seems reasonable to maintain that the same aspectual distinction holds here between $?asol:dax^w$ 'go!' and $?asol-dax^w$ 'he took it.' We thus re-spell these as $*?as-sol-h-dx^w$ and $*?as-sol-dx^w$.

The rule for h-assimilation of l is thus:²

$$\begin{array}{c} 3 \\ [+lateral] \\ [-checked] \end{array} \rightarrow [-voice] \quad \text{in env. / } \begin{array}{c} \left[\begin{array}{l} -cons \\ +voc \\ -syllabic \\ -voice \\ +cont \end{array} \right] \begin{array}{l} 4 \\ \\ \\ \\ \end{array} \end{array} \quad \text{)stem}$$

h is of course assumed to be deleted later in the environments C- (obligatorily) and $-C^5$ (optionally).

With Figure 28(d) we re-open the question, mentioned in the Notes, of the alternation $l \sim \pm \sim l^?$, making the assumption that the groups of forms are in fact semantically and phonologically related.

It is likely that the interpretation of the h-mutation phenomenon as one applying only to semi-vowels y and w⁶ was unnecessarily narrow; it may well be that l is also involved. If this is so, then we have a further criterion for asserting that the rule for h-unvoicing must precede the h-mutation rule (compare footnote 2 below). On the other hand, it is

¹See Chap. II, sec. 15.3.2.

²h must clearly unvoice l before the $h \rightarrow ?$ rule; we should otherwise get (e.g.) $*?iq^w dal^?$, with no way of deleting the final $?$. For $\pm \frac{1}{2}$, see Chap. II, Sec. 20.3.

³[-checked] is required to distinguish l from λ , in the rule.

⁴?never unvoices l. We thus exclude the [-cont] semi-vowel.

⁵Compare Chap. II, secs. 15.3/4; h-loss is optional in $\acute{V}-\acute{C}$ (he¹⁶h-čad).
stem

⁶Chap. II, sec. 16.4.

difficult to see just what difference in shape or constituent structure would guarantee the outputs $sólʔ$ and $ʔask^wəlʔ$: One can only suggest that these be suitably marked in the dictionary with the rule-feature [not 1-unvoicing], for they would then automatically arise from $*sólh$ and $*ʔask^wəlh$, by the h-mutation rule.¹

II.16. Rule Summary 3²

1. Constituent Structure, for Augment.
2. Stress assignment for Augment.
3. V - a mutation, under secondary stress.
- ** 4. Affix truncation.
- ** 5. C-h metathesis.
- ** 6. Laryngeal affection.
- ** 7. Vowel assimilation.
- ** 8. Stress-shift to affix (optional).
- ** 9. h unvoicing of l.
- *10. V-losses (to h) { in unstressed (Augment) reduplication.
by modified 'counting' rule.
11. $h \rightarrow \begin{cases} \emptyset \\ ʔ \end{cases} \begin{matrix} 1 \\ 2 \end{matrix}$ before voiceless stop
abutting R.
12. ʔ- metathesis.
13. Y-metathesis. (Augment only?)
14. Vocalization of semi-vowels.
- *15. Glottal absorption. Environment very constrained, but probably occurs within stems too.
16. Change of obstruency for N.
17. $\overset{?}{B}$ lose glottalization.

¹ It is, of course, just as reasonable to hold that these forms have been re-shaped, and are to be written in the dictionary $*sólʔ$ and $*ʔask^wəlʔ$ directly. Compare 'dictionary final ʔ' in (e.g.) $sədax^w-ʔólʔ$ 'blood,' $x^wélʔ$ 'lose,' $təlʔ$ 'take off.'

² Compare Summary 2, Chap. II, sec. 10 (p. 71): * shows rules modified; ** shows rules added; of course, with re-numbering. Note that the rules are no longer all confined to the Augment.

N = Nasal

B = Voiced obstruent

R = Resonant

18. Cluster-simplification.
 19. s-assimilation. (Prefix ʔas-)
 20. Geminate simplification.
 21. Shwa insertion
 - 22/23. Treatment of voiced obstruents.
- **N.B. Rule for loss of remaining h in cluster with consonants--ordering unclear, but follows Rule 10. A form like ʔálasqəh 'outside' would otherwise lose its final shwa--which is not replaceable by shwa-insertion.

II.17. Laryngeal Stems

<u>Unaugmented</u>	<u>Augmented</u>	<u>Gloss</u>
ʔáxcəd	xaʔáxcəd	bed ¹
ʔaléš	laʔálas ~ laʔálas	sister ² (m. speaker)
s-ʔáptsəd	s-pa-ʔáptsəd ~ s-páʔáptsəd	heel ³
dax ^w -ʔácawalbəd	dax ^w -ca-ʔácawalbəd	vehicle ⁴
ʔas-ʔáp	ʔas-paʔáp ~ ʔas-páʔáp	wiped
ʔébac	be-ʔébac	grandchild
s-ʔélal	s-leʔélal ~ s-lə-ʔélal	song
ʔas-ʔéx	ʔas-xe-ʔéx ~ ʔas-xéʔéx	scraped
ʔas-ʔéwad	ʔasa-weʔéwad	invited
bo-ʔólasqə(h)	bə-ləʔólasqə(h)	go out ⁵
s-ʔobāt	s-bə-ʔóbat	name
s-ʔólaxeʔəd	sə-ləʔólaxeʔəd	dish ⁶
ʔas-ʔóšab	ʔəš-šə-ʔóšab	charitable
ʔas-ʔóx ^w šab	ʔas-x ^w o-ʔóx ^w šab ~ ʔas-x ^w əʔóx ^w šab	having bought a wife
ʔas-ʔopál	ʔas-po-ʔópal	eaten
ʔəbərəbəd	bə-ʔəbatəbəd	seat ⁷
ʔas-ʔáy ^ʔ	ʔas-ya-ʔáy ^ʔ	paid
ʔas-ʔaléx ^w	ʔas-lə-ʔálex ^w	hunter
ʔas-hóbšəd	ʔasa-bə-hóbšəd	red foot
həlé-čəd	ʔas-lə-həlé-č	I'm alive, ⁸ we're alive

Fig. 29.--Laryngeal-Initial Stems

¹ Compare ʔaxéc 'go to bed'; thus *ʔaxéc-Vd as Nominal derivative, with normal vowel-loss following stress-retraction.

Fig. 29--cont.

²For the optional vowel-loss in *lʔálaš* (later *ləʔálaš*, by shwa-insertion) see Chap. II, sec. 17.2.

³For optional stress-shift giving *s-pá-ʔaptšəd*, see Chap. II, sec. 15.6.

⁴Compare *ʔacáwal*- 'be riding.' Here Nominal derivation *dx^w*-stem-bd, with retraction of accent. Stress-retraction in derived nouns is common, but not entirely predictable.

⁵The glottal stop in *bə-ləʔóʔləsqəh* results from vowel-loss after the stress (see Chap. II, sec. 12) followed by glottal attraction. The final shwa remains, before final *h*.

⁶*s-ʔólaxəʔəd* apparently contradicts the vowel-loss rule: we therefore reconstruct **s-ʔólax-ayəd*, by analogy with forms like *ʔkáyas* ; *k-ʔákeʔəs* (see Chap. II, sec. 12.3 [end]).

⁷Compare *ʔabót* 'he sat down.' Here, with Nominalizing suffix *-béd* ; uniquely, the suffix bears primary stress in the unmarked form.

⁸From **həléh* ; compare *hələh-šdə-bət* 'he saved himself,' a transitive (-d-) reflexive (-bət-) formation.

II.17.1. Introduction

With the insights on the behavior of glottal stop and *h* already gained, we turn now to the question of the behavior of stem glottal stop and *h*. We shall show that, although stem-initial *ʔ/h* behave differently from other consonants, their idiosyncracies there parallel those shown by *ʔ/h* elsewhere. In particular, no compelling motive will appear for re-interpreting *ʔv*-initial stems as underlyingly vowel-initial, that is, for assuming that initial glottal stop is automatically inserted before what are really vowel-initial stems.

Similar idiosyncracies occur in the augment when the final consonant of the initial syllable (*C*₂ hereafter) is glottal stop or *h*. We shall characterize stems having a laryngeal as *C*₁ or *C*₂ simply as 'laryngeal stems,' for the remainder of this thesis.¹

¹Thus, 'laryngeal-initial' refers to *ʔ/h* as stem-initial; while 'laryngeal-final' refers to *ʔ/h* as *C*₂ of a stem.

II.17.2. Laryngeal-Initial

Suppose we attempt to derive the augmented forms for some of the examples in Figure 29, assuming that the 'spelling rule' for Reduplication in the Augment is exactly the same as for forms with other than ʔ/h -initial, viz., C_1VC_2 . Let us take ʔéx 'scrape' and ʔélal 'sing'.¹ $*\text{ʔéx-ʔéx}$ gives ʔx-ʔéx (by vowel-loss) then xʔ-ʔéx (by glottal attraction), then x-ʔéx (geminate-simplification)² then xə-ʔéx (shwa-insertion). We notice that, unless we invoke a second vowel-assimilation rule, we cannot get the alternant output, xəʔéx (or xéʔéx , by [optional] operation of stress-shift).³

The case of $*\text{ʔélal}$ is even worse. $*\text{ʔél-ʔélal}$ gives ʔʔl-ʔélal (vowel-loss and ʔ production). Then, assuming one glottal stop is attracted, we are left with ʔʔʔ-ʔélal , with no way of deleting the initial glottal stop. The completely ad hoc convention that both glottal stops will be attracted must then be matched by the equally ad hoc convention that the triple glottal stop now appearing after glottal attraction ($*\text{ʔʔʔ-ʔélal}$) is simplified by the geminate-simplification rule. As with ʔéx , of course, there is no way to produce the (commoner) alternant ləʔélal .

With the h-initial stems, we are in no better a position. Deriving the augment for a form such as ʔas-hóbšəd , we get $*\text{ʔas-hob-hóbšəd}$, then ʔs-hʔb-hóbšəd (by vowel loss and glottal stop development), then ʔs-hbʔ-hóbšəd (by glottal attraction), then ʔs-bʔ-hóbšəd (by h-loss before a consonant). Now while the medial glottal stop will be absorbed (by b), there is (as before) no way to derive the alternant ʔas-bohóbšəd without invoking a second vowel-assimilation rule.

One simple solution to the problem of the additional glottal stops in these derivations is to adopt the convention that ʔ/h -initial stems do not develop glottal stops from the vowels lost in Augment, even if ' C_2 ' is a voiced consonant. This certainly gives the alternants xəʔéx and ləʔélal , assuming only that geminate glottal stops are simplified. But how are we to derive the alternants xéʔéx and léʔélal , without an additional rule for vowel-harmony?

¹Compare the argument from the Distributive Numerals, Chap. II, sec. 14.

²Chap. II, sec. 7.6.

³See Chap. II, sec. 15.6.

The notion that the presence of stem-initial ʔ/h somehow inhibits the development of a glottal stop, is clearly not powerful enough to enable us to generate the second alternant (e.g., leʔélal). Recalling that a laryngeal may in certain circumstances be lost when stem-final, we now propose that stem-initial laryngeals are in fact also lost in the unstressed reduplicating syllable.

The fact that glottal stop is not developed for such stems in augment is then very simply explained: If ' C_1 ' is first lost, then there is no 'C-C' environment, and the vowel itself is not lost. What, then, becomes of the vowel in such a case? We do not get forms such as $^{**}\text{el-ʔélal}$. We propose that, after the loss of the initial ʔ/h segment, the vowel of the reduplicating syllable metathesises with the ' C_2 ' segment. Thus, the derivation is as follows: ʔel-ʔélal gives el-ʔélal (loss of initial ʔ/h), then le-ʔélal (by metathesis), which is the 'common' alternant.

We found it implausible to derive the alternant leʔélal from the alternant laʔélal (above); can we now hold that laʔélal may be derived from leʔélal ? In the light of what has been discovered concerning the loss of vowels in unstressed syllables, especially those preceding the stress, the suggestion seems most plausible. Let us review some supporting evidence.

Two situations in which an optional vowel-loss occurs in pre-tonic position are the following:

1. With the present-continuative aspect prefix be- . Thus we have $\text{beʔélal} \sim \text{beʔélal}$ 'he's singing'; be-leč-é-čad 'I'm scattering,' but (commonly) be-leč-a-čad 'I'm scattering them.'

2. In di-syllabics containing shwa in the first and unstressed syllable (see Chap. II, sec. 4). Here we contrast yəlʔəx ; yəlʔ-yələx 'gathered,' with s-yələb ; $^1 \text{s-yəlʔ-yələb}$ 'year.'

With the above data in mind, we see how the alternants such as laʔélal can be derived from those such as leʔélal .

We suggest that, as above, the unstressed pretonic vowel is optionally lost (with following laryngeal) in the forms under discussion. Maximum productivity is gained for the rule if it also deals with forms like $\text{beʔélal} \sim \text{beʔélal}$ above: thus, the proposed rule must follow the Augment

¹ Alternant to s-yələb . We should expect s-yəlʔəb if the rule were obligatory.

metathesis that gives $le^?élal$ from the stage $el^?élal$ (i.e., after deletion of initial laryngeal). Thus:

1. $?/h$ deletion.
2. Augment metathesis.
3. Optional deletion of V_1 in env. / $-?/hV_1$.¹

But if we derive (augmented) $l-?élal$ according to this series of rules, it is immediately obvious that the shwa-insertion rule will not be able to operate to give the desired $la^?élal$, for glottal-absorption (which necessarily precedes shwa-insertion) will give $*l^?élal$, the environment for shwa-insertion being thereby lost.

It is therefore in order to re-examine glottal-absorption. Here we note that (Chap. II, sec. 13), in order to allow for stem glottal-absorption (thereby including cases such as $yadés$), sub-rule 2 was modified to read:

$$\begin{bmatrix} +cons \\ +voice \end{bmatrix} [?] \longrightarrow \begin{bmatrix} +cons \\ +voice \\ +checked \end{bmatrix} \quad \text{in env. / } - (C) \check{V}$$

This allowed for both $tb^?-tóbax^w$ and $yd^?és$.

To prevent the same sub-rule taking $l-?élal$ to $*l^?élal$, it is clear that we must constrain glottal-absorption from operating when the absorbing segment is initial ($l-?élal$), if there is no consonant following. This constraint is best expressed as a 'condition' on the sub-rule above, reading:
Condition on sub-rule 2: If C is null,

Then $\begin{bmatrix} +cons \\ +voice \end{bmatrix}$ may not be in env. / $\#$ -

II.17.3. Laryngeal-Final

The reason for the retention of the vowel of the reduplication syllable, as suggested above, was that the ' C_1 ' segment had been lost, since it was a laryngeal. Consider now the forms of Figure 30, where the reduplication seems to be ' C_1V_1 '. It seems reasonable to maintain that the retention of the vowel can be attributed to the same cause, viz., the loss of $?$, this time as ' C_2 ' of the reduplicating syllable.

¹For the generalization and further ordering of this rule, see Attenuative (Chap. IV, sec. 4).

	<u>Unaugmented</u>	<u>Augmented</u>	<u>Gloss</u>
(a)	q ^w ɔʔ	q ^w o-q ^w ɔʔ	water; river ¹
	dɔʔ	do-dɔʔ	rotten
	čáʔlaš	ča-čáʔlaš	branch
	dáʔ šəd	da-dáʔšəd	foot-print
	dášəd	šədášəd	foot-print
	qáʔbe	qa-qáʔbe	girl
<hr/>			
(b)	čáʔyat	čeʔ-čáʔyat	fish gill
	dəʔwat	do-dəʔwat	wave waves

Fig. 30.--Laryngeal-Final Stems

¹sq oq ɔʔbəš 'Skokomish' is thus s-q^wo-q^wɔʔ-bəš 'river people,' regularly derived (from the plural of 'water' as 'river') with s- nominal prefix, and -bəš 'people' (probable related to pluralizing -óbəš). *s-q^wo-q^wɔʔ-obəš would give the correct output by the rules already given.

We therefore propose amending the rule for laryngeal¹ deletion (Chap. II, sec. 17.2), which now reads as follows:

$$ʔ/h \longrightarrow \emptyset \text{ in env. } / \left\{ \begin{array}{c} -V_1C_2 \\ C_1V_1 \end{array} \right\} \& \text{)Aug redup.}$$

We thus derive not only:

$$ʔel-ʔélal \longrightarrow \underline{e}l-ʔélal \longrightarrow \underline{le}-ʔélal \longrightarrow (\text{opt}) \underline{l} ʔélal \longrightarrow \underline{la}ʔélal,$$

but also:

$$qǎʔ-qǎʔ \longrightarrow qǎʔ- qǎʔ \longrightarrow qǎ-qǎʔ.$$

¹There is no certain attestation of Augmented forms from stems containing h as 'C₂.' Nevertheless, the parallel behavior of h in other respects leads us to suppose a parallel here, too. Cf. Attenuative with h as C₂.

A solitary form, sədáde(h) 'money,' may prove to be our single example. If it is indeed an augmented form, then its underlying shape would be *s-dəh-dəh: but this suggests that 'laryngeal affection' precedes the loss of (C₂)h. Cf. Rule Summary 4, Rule 3, where it is assumed that a laryngeal as either C₁ or C₂ is lost earlier than laryngeal affection.

It is crucial to distinguish these forms from those of sub-corpus (b). If we postulated underlying forms such as $**\acute{c}\acute{a}^1yat$, $**d\acute{a}^1wat$, we could not derive the correct outputs. Thus (e.g.) $**\acute{c}a^2-\acute{c}\acute{a}^1yat$ gives $**\acute{c}a-\acute{c}\acute{a}^1yat$ (by deletion of C_2 as glottal stop), but this would require a completely ad hoc rule to replace the a by e to get $\acute{c}e^1\acute{c}\acute{a}^1yat$. The underlying form, as has already been shown (see p. 46) must be $*\acute{c}\acute{a}y^1at$.

The case of $d\acute{a}^1wat$ is even more interesting. If we assumed $**d\acute{a}^2-d\acute{a}^1wat$, we should derive $**d\acute{a}-d\acute{a}^1wat$, which is clearly wrong just as we saw above for $\acute{c}\acute{a}^1yat$. But the derivation which will give the correct vowel in the reduplication can only result from an original w. However, reconstructing with a w gives us $*d\acute{a}w-d\acute{a}^1wat$, then $d^1w-d\acute{a}^1wat$ (by vowel loss and 1 -production in the reduplication), then $dw^1-d\acute{a}^1wat$ (by 1 -attraction, both in the reduplication and in the stem), then $do^1-d\acute{a}^1wat$ (by semi-vowel rule). Why, then, do we get $do-d\acute{a}^1wat$ as the correct output? Clearly, the glottal-absorption rule must operate here, so that the glottal stop is later deleted when non-obstruent nasals change their obstruency.

Let us recapitulate the derivation, restoring the underlying nasal segments for clarity: $n\acute{a}w-n\acute{a}^1wat$, $n^1w-n\acute{a}^1wat$, $nw^1-n\acute{a}^1wat$, $no^1-n\acute{a}^1wat$; then $no-\acute{n}\acute{a}^1wat$ (by glottal absorption), then $do-d\acute{a}^1wat$ (by change of obstruency), then $do-d\acute{a}^1wat$ (by loss of glottalization on voiced obstruents).

The case of $d\acute{a}^1\acute{s}\acute{s}ed \sim d\acute{a}\acute{s}\acute{s}ed$; $da-d\acute{a}^1\acute{s}\acute{s}ed \sim \acute{s}\acute{s}ed\acute{a}\acute{s}\acute{s}ed$ in turn shows that we must on occasion recognize free alternants in the dictionary: but the augmented forms match these alternants perfectly! For $d\acute{a}^1\acute{s}\acute{s}ed$, the form $da-d\acute{a}^1\acute{s}\acute{s}ed$ corresponds, as shown above; while for $d\acute{a}\acute{s}\acute{s}ed$, $\acute{s}\acute{s}ed\acute{a}\acute{s}\acute{s}ed$ corresponds, derived from $*na\acute{s}-na\acute{s}\acute{e}n$ with the addition of the cluster simplification rule (Chap. II, sec. 7.3).

II.18. Specification of h/, w/y

II.18.1. General

From the whole of the preceding discussion, the following summarizes the behavior of glottal stop, h, and y.

First, these are the non-vowel segments which participate in metathesis. Glottal metathesis (or attraction); h-metathesis (as in

qáhse; qs-qáhse); and y-metathesis (as in yašad; še-⁴yašad) are all well attested in the preceding corpora. Setting these segments apart from both the vowels and the other non-vowels (including l), let us call them the class of [+oral]¹ semi-vowels.

Glottal stop and h behave distinctively as regards laryngeal affection, vowel-assimilation, optional stress-shift, and deletion as stem 'C₁' or stem 'C₂' in reduplication: these constitute the sub-class of voiceless semi-vowels, a class divided internally by the feature of [continuousness].² By the same token, w and y constitute the sub-class of voiced semi-vowels, distinguished primarily³ by the feature of [oral].

II.18.2. w/y and the Semi-Vowel Rule

So far as the specification of the segment alternations w/o and y/e is concerned, the definition of w/y as semi-vowels would normally include the feature [-vocalic], the alternation being then defined as a change of [-vocalic] to [+vocalic] for both.

Thus:

$$\begin{bmatrix} \text{-Cons} \\ \text{-Voc} \\ \text{+Voice} \end{bmatrix} \longrightarrow \text{[+Voc]}, \text{ in certain environments.}$$

However, although the formulation just given is certainly simple, we should prefer one more closely corresponding to the notion that we have to do with the syllabification of certain segments. How may we convey this notion within the present framework?

It is most probable, questions of 'phonological markedness' aside, that any universal theory of phonology will require the addition of

¹For the motivation of 'Oral,' see Chap. II, sec. 7.

²The classification of h/? as semi-vowels has thus been made purely on the grounds of similarity of behavior with w,y. We note that, for Twana, it would have been difficult to consider h/? as 'obstruents,' for we already have a segment marked [+Grave, +Compact, +Checked, -Cont], viz., q. For discussion of h, see Chap. IV, sec. 4.4.3.2.

³'Primarily' refers to the minimal specification possible in the rules (here, the Semi-vowel Rule).

Syllabicity to the total roster of distinctive features.¹ If we assume that this is so, then clearly we are at liberty to use this feature; indeed, we are required to use it, if its use in any sense clarifies the phonology of the language under discussion.

Suppose, then, we specify all the non-vowel segments of Twana as [-syllabic]. We are now able to define the process of vocalization of semi-vowels as a syllabification, as we desired. We do not want this syllabification, however, to apply to w,y by virtue of their partaking of 'voice'; we should also prefer to avoid having to reverse the sign on the feature [vocalic] (for w,y are at present defined as [-vocalic]) in the rule in question.

We may avoid both these problems by the simple expedient of re-defining w/y as [+vocalic]. As before, the binary quantity of a single feature (syllabicity) is reversed in the semi-vowel rule; instead of $\begin{bmatrix} -\text{cons} \\ -\text{voc} \\ +\text{voice} \end{bmatrix}$, the left hand side of the rule will require to specify $\begin{bmatrix} -\text{cons} \\ +\text{vocalic} \\ -\text{syllabic} \end{bmatrix}$, for w/y are now distinct from ʔ/h by the feature of vocalicity, and not voice, but distinct from l primarily by consonantality.

We now define the 'environment' of the semi-vowel syllabification rule.

Examples:

R ^w óy	R ^w eʔ-R ^w óy	mother, pl.
láwalbəs	loʔ-láwalbəs	Indian person, pl.
s-lálaq	s-lálaq-eh ²	thimble-berry, -bush
yaq ^w ólʔwəltx ^w ~	eq ^w ólʔwəltx ^w	washing the house
ʔas-láw	dəx ^w -láʔo-bəd	baked, baking-pan
tkáyas	k-tókeʔəs	basket, pl.
s-yoʔés } ~ s-eʔwés }	s-yoʔ-yáwas	wood, pl.
s-q ^w əbáyʔ	s-q ^w əʔə-q ^w əbeh	dog, puppy

¹This suggestion is owing to MacCawley (personal communication). He remarks that 'Syllabicity' will be required for any language (such as Sanskrit) exhibiting both semi-vowel ~ vowel alternation and syllabification of r and l, and claims that the new feature must therefore find a place in the roster of features. See MacCawley (1967), and fn.2, p.115 on redundancy of vocalic.

²*s-lálaq-ayh (Chap. II, sec. 12.3).

Taking w,y,² h,b and d (at this point, m,n) as non-obstruents, the above sample corpus shows that all combinations of obstruent and non-obstruent are proper environments for syllabification of a semi-vowel. In addition, syllabification occurs (optionally) word-initially before an obstruent.

We note, finally, the alternants s-yoʔés ~ s-eʔwés, which illustrates the alternative syllabifications of semi-vowels that follow the stage of derivation s-yʔwés (from underlying *s-yawés,¹ compare augmented s-yoʔ-yáwas), depending on whether or not glottal attraction occurs: with glottal attraction, we get s-ywíés, then s-yoʔés; without glottal attraction, we get s-yʔwés, then s-eʔwés.

The semi-vowel rule may thus be formulated as follows:

Amended Semi-Vowel Rule:²

$$[-\text{cons}] \xrightarrow{+\text{voc}} [+syll] \text{ in env. } \left\{ \begin{array}{l} [-\text{cons}]^1 \\ [-syll]^1 \\ [-syll]^2 \\ \text{opt. } [\#]^3 \end{array} \right\} - \left\{ \begin{array}{l} [-\text{cons}]^3 \\ [-syll]^1 \\ [-syll]^2 \\ [-syll]^3 \end{array} \right\}$$

II.19. d-Loss, n-Loss

Our final topic so far as Twana consonants are concerned, will be the loss of 'final d'.⁴

Comparing Figure 31 sub-corpora (a) and (b), we note that stem-final -d is lost before third singular possessive -s and first plural -i, but that stem-final -t is not lost in these environments. This suggests that we consider the segments lost to be still distinctively non obstruent at the point

¹By the vowel-loss rule, applying to the unstressed shwa in pretonic position.

²But see the revised formulation (Chap. IV, sec. 2.3) made possible by redefinition of the Major Class features as Sonorant, Consonant, and Syllabic. Note that this redefinition makes the Feature [Vocalic] redundant.

³The affix-truncation rule must also be amended accordingly. The 'exception rider' must now read 'but not [+voice] $\begin{bmatrix} -\text{cons} \\ -\text{voc} \\ -\text{syll} \end{bmatrix}$ '

⁴Compare the discussion of the specification of 'output b,d.' See Chap. II, sec. 8.

	<u>Non-Poss.</u>	<u>3rd Sg. Poss.</u>	<u>1st Pl. Poss.</u>	<u>Gloss</u>
(a)	s- [?] obát	s- [?] obát-s	s- [?] obát- [?]	name
	q ^w ést	q ^w ést-s	s-q ^w ést- [?]	cow
	xō [?] bat	xō [?] bat-s	xō [?] bat- [?]	paddle
(b)	yašád	yašád-as		leg ¹
	s- ^q -šád	s- ^q -šád-as		toe
	s- ^q -sə ^q -šád	s- ^q -sə ^q -šád-s		toes
	sə-báded	sə-báde-s	sə-báde- [?]	mountain
	báč [?] lad	báč [?] lad-s	báč [?] lad- [?]	flea
	bád	bád-as	bá- [?]	father
(c)	lék ^w a-čəd	lék ^w a- [?]		I speak; we speak
	lék ^w a-č	lék ^w a-čp		you speak(sg.,pl.)
	lék ^w ad.	lék ^w ad- [?] la [?]		he speaks; they speak ²
	pésat	pésat-čə		big ones; big hands
	táwəd	sól [?] táwə-čəd		town; I go to town
(d)	hédab-dəx ^w -čəd	hédab-dəx ^w -čə-x ^w tél		I went; I went down
	be-q ^w éc-čəd	ʔədá-čəq ^w -be-q ^w éc		I dance; I just dance ³
	be-q ^w éc-č	ʔədá-č- ^q -be-q ^w éc		you dance; you just dance

Fig. 31.--d (n) - Loss

¹Note the relation of the 'bound' to the free form for 'leg,' in the form for 'toe.' Compare ʔas-sə^q 'split' for the other etymon involved. The plural must exhibit cluster-simplification, but the presence of s-nominal masks the simplification for s-initial stems, since s-s in any case gives s by geminate simplification.

²The person marker for third plural is *wə[?], the output from which is -ʔwə[?] (the vowel-loss giving glottal stop, which is then attracted towards the stress); this gives allomorph ʔə[?] after consonant-final stems: no general w-loss rule obtains in Twana, so a special rule will be required here.

³ʔədá(h) is one of a number of pre-posed 'auxiliaries.' Since subject person is marked only once per phrase (ʔədá-čəd-), the following main verb (e.g., q^wéc 'dance') is marked for aspect (be- continuous, neutral tense) but not for subject.

of loss, i.e., that the rule for (what we must re-name) 'n-loss' precedes the rule for change of obstruency.¹

Sub-corpus (c) consists of the (unmarked) paradigm of the verb 'speak.' Third person singular is the 'unmarked' person, and only there and in third plural does stem-final *-n remain. We thus add 'consonantal person markers' to the list of environments for n-loss. Support for this interpretation is offered by the loan word 'town' in the same sub-corpus.

Sub-corpus (d) shows that the one n-final person marker (first singular) also loses its n before a word-initial consonant. Here, however, the attestation from texts suggests that the n-loss rule is one which may be suspended in slow speech, or where a phrase is re-divided for rhythmic purposes. We compare the citation in (d) with *ʔadá-čəd* *ŋ* *q^w-bə-laláb* 'there I was, just rowing!'²

n-Loss Rule: ³

$$[+nasal] \begin{matrix} 4 \\ -grave \end{matrix} \longrightarrow \delta \text{ in env. } / \quad - \text{ \& } [+cons] \begin{matrix} \text{ } \\ \text{stem} \end{matrix}$$

II.20. Shwa-Insertion

II.20.1. General

Swadesh⁵ refers to ' . . . the false vowel, a vocalic murmur between consonants in clusters, whose timbre is much influenced by the neighbouring consonants. . . . ' . . . the fact that the false vowel is actually recorded with the same symbols as the phonemic vowels caused errors even in Boas' work.'

¹For the relative ordering of 'n-loss' and 'glottal absorption' rules see Chap. II, sec. 20.5.

²From "The Storm Mountain." A signifies phrase-internal pause. The unity of the total citation as a single phrase is proven by the single occurrence of the subject morpheme -čed 'I.'

³Despite the phrasal unity shown by the syntax (fn. 2, above), -čed(n) above must be considered as word-final still, and hence not liable to 'n-loss.'

⁴Perhaps [_{+nasal}
+oral] is better. This parallels the cluster-resolution rule which requires [oral] (Chap. II, sec. 7).

⁵Swadesh (1952) ..

We have shown above that certain occurrences of shwa must be considered segments of dictionary entries, while others are the result of an insertion rule--even, in certain cases, replacing an 'original' shwa where the latter was deleted by the vowel-loss rules. The inserted shwas correspond to Swadesh' 'false vowel,' although it must be clear that, for a given environment, all unstressed shwas in Twana have the same phonetic shape.¹

	<u>Augmented</u>	<u>Gloss</u>
(a)	q- <u>abáqsad</u>	noses
	ʔ- <u>amóʔ</u>	proud
	x- <u>alʔóx</u>	lights
	t- <u>abóʔ</u>	suckled
	ʃ- <u>adécʃ</u>	scratched
	də-s- <u>adéʔ</u>	mine
	də-k ^w - <u>tábac</u>	} Unaugmented my husband (non-definite)
	t-ə-d-k ^w - <u>tábac</u>	
(b)	s- <u>q-sáq-šad</u>	toes
	q- <u>abáqsad</u>	noses
	láwal <u>baš</u>	Indian person
	k ^w t-k ^w - <u>tábac</u>	husbands
	pq ^w - <u>páq^w-q^wəd</u>	hair all feathered
	k- <u>tákeʔas</u>	baskets
(c)	qab- <u>qábád</u>	axes
	q ^w əlʔ- <u>q^wálde</u>	ears
	tab- <u>tób</u>	scarred
	s- <u>abad-báde</u>	mountains
	wad- <u>ʔwádaw</u>	horns
	yad- <u>ʔyádas</u>	teeth
	<u>Unaugmented</u>	
(d)	patáb	when
	patóʔlas	spring
(e)	sáléʔəlʔk ^w as	his speech, language
	ʔadá-čə- <u>q^w-betéq^wab</u>	I'm just playing
	ʔadá-š- <u>q^w-betéq^wab</u>	You're just playing

Fig. 32.--Shwa Insertion

¹ See Chap. IV, sec. 4.4.2.

We deal here fully only with those aspects of shwa-insertion which are purely phonological, mentioning in a brief note (Chap. II, sec. 20.4) one or two complications attaching to the specific morphemes *s-* nominal and *ʔas-* stative.

Figure 32(a) exemplifies two regular environments for shwa-insertion: these are, after an initial voiced consonant (e.g., *d-* first singular possessive, as in *də-k^wtábac* 'my husband') and before a voiced consonant preceded by a single initial consonant (as in forms such as *q-əbəqsəd*, with cluster-simplification, from **bəq-bəqsəd*).

Sub-corpus (b) adds the two environments 'before a final voiced consonant preceded by a consonant,' and 'after a voiced consonant preceding a final consonant,' as in *s-ə-səq-əəd* 'toes,' and *k^wt-k^wə'təbæc* 'husbands.' The form *k-tákeʔas*¹ now shows that 'voiced consonant' is not a wide enough term for our purpose. If glottal stop is to be included, then it is reasonable to suppose that shwa-epenthesis precedes the change of obstruency of the nasal non-obstruents, and that its environment refers to 'non-obstruent,' instead of 'voiced consonant.'

Sub-corpus (c) generalizes the first environment we found in sub-corpus (b), to 'before any voiced consonant preceded by a consonant': thus *təb-lób*, from *tb-lób*. On the other hand, two important constraints on shwa-insertion also appear.

Cf. *ə^wəláde*; *ə^wəl^ʔ-ə^wəlde* with *k^wtábac*; *k^wt-k^wə'təbæc*: then the original *a* of *ə^wəláde* is lost in augment without shwa-replacement, whereas the *a* lost in augment from *k^wtábac* is replaced by shwa later. It is reasonably clear that no shwa is inserted between a segment specified as [+vocalic], [-syllabic], (i.e., w,y,l), and a following nasal within the primary stem, e.g., *yətáwad~yətáwde*² 'salmon-berry,' *ləwalbəʃ* 'Indian person,' *səʔwəsaldəx^w* 'sky.'

¹Compare unmarked *tákayas*, and thus augmented **tək-tákayas*, *tək-tákyʔas*. For the same environment initially, compare the many cases of *ʔas* → *ʔəs-*, then *ʔəs-* in stative augment.

²The corpus attests the interesting doublet *yətáʔode ~ yətáwde*; the former showing glottal-attraction and syllabification of *w*, the latter showing no glottal-attraction but subsequent absorption and loss of the glottal component (from **yətáwad-ayh*)(see Chap. II, sec. 12.2).

The second constraint is rather more problematic. For the type bəb-lob 'scarred' or cəd-cədaɪ 'they' we require no explanation for the non-appearance of inserted shwa at the morpheme-boundary, since we asserted that (except for initial and pre-final voiced consonants) the shwa-glide is always inserted before the voiced consonant. However, the augmented bəd-bədaɪ 'children,' etc. (sub-corpus [c]) suggests that the constraint must also operate for morpheme-initial voiced consonants within a stem.

Shwa-Insertion Rule: $\phi \longrightarrow a /$

$\left\{ \begin{array}{l} \left\{ \begin{array}{l} C_1 - C_2 \\ 1 - s_2 \end{array} \right\} \text{ in pause}^1 \\ \\ C_1 - C \\ [+voice] \\ \\ \# C - ? \end{array} \right\}$	1	1[Condition 1. Either or both C_1, C_2 is [+voice] 2. C_2 is not a laryngeal
	2	2[Condition 1. C_1 is not l w y 2. Not across Augment '&']
	3	3[Condition (?) but not with s- Nominal]

II.20.2. With n-Loss

We asserted above (Chap. II, sec. 1.2.1) that in di-syllabic stems we could assume that unstressed shwa in the first syllable is deleted by the vowel-loss rule: the 'saving clause' was, of course, that the stems then considered never showed a shwa in the position concerned except where 'C₁' or 'C₂' was voiced. How, now, are we to explain forms such as *patáb*?

If the vowel-loss rule deletes the shwa, as it should (since shwa is between voiceless consonants), is the shwa-insertion rule to operate and replace it?

Consider sub-corpora (d) and (e). Clearly, the answer to the question above is that the shwa is lost and is in fact replaced. It is thus obvious that the n-loss rule which produces forms of the shape pstáb must operate after the rule replacing lost shwas (as well as supplying ə- glides, as in q-əbʔqsəd).² However, while *pən-čéx gives pə-čéx, just as *lék^wan-čn gives lék^wa-čəd, we note that pəd-qəp, pəd-sétə(h)³ and pəd-qaʔatəd have not lost -ŋ. Suppose we hold that we have to do with instances of 'frozen forms': how is such a notion to be formalized within the theoretical framework we have adopted? Specifically, we must represent the constituents

¹'In pause' here means initial or final.

²But see Chap. II, sec. 20.4.

³Cf. sélad 'food.' An ill-understood d-loss.

involved in such a way that the n-loss rule operating on *pən-čéx does not operate on *pən-séla(h).

There are two ways of achieving our purpose. The first is simply to mark the dictionary entries concerned with the feature {not n-loss rule}. However, although this marks the appropriate forms as 'exceptional' and guarantees the correct outputs, the marking suggested does not seem to correspond in any way to the notion we started out to explicate, viz., 'frozen form.'

A better correspondance might well follow from the assertion that a form like *pən-séla(h) is not being treated as a compound. If (e.g.) pad-čéx is considered to contain 'simple morpheme boundary,'¹ then we might represent pad-séla(h) with 'internal word boundary': thus *pən-čéx but *pən#₁séla(h). It is now quite simple to explain the different treatment of the two forms; the rule (p. 117) for n-loss refers to 'simple morpheme-boundary,' and *pən#₁s-éla(h) thus requires no further special marking to ensure that it will not lose its n²

(a) With following - b

séll-bad	half brother	cf. ʔel-séq	split
be-ʔeíl-báʔyac-čəd	I'm eating meat	cf. ʔélad	eat : báʔyac meat
but: séʔesléd	a snack (Atten.)		

(b) With following - d

k ^w éí-all-dəx ^w	it spilled	cf. k ^w éí	pour
s-láʔa-líde(h)	little girl (Atten.)	cf. s-láday	woman
-leʔéll-dəx ^w	he's way over there	cf. leʔéí	yonder
dəwéh wəll dəcáh	you and I	cf. wəí te dáqas	and the other
But: ʔəs-ləb-lób	scarred (Aug.)		

(c) With following - w

s-k ^w ác-a-llwəlbəš	half-breed	cf. láwalbəš	Indian
but: ʔəwəqədəx ^w	he got frightened		

¹The view here held concerning the nature of junctures is that they simply delimit the spans over which rules operate. There is no implication (cf. Joos, 2nd Texas Conference) that internal open juncture corresponds to a 'delay within the utterance,' or indeed to any constant acoustic property (see Lehiste [1960]).

²Since #₁ is a higher 'ranking' boundary, forms containing it will simply not be affected.

(d) With following - y

seséd-all yadə ⁷ was	big-heart	cf. yadə ⁷ was	heart
but: ʔəs61 yəq ^w 6sab	go and wash!	ʔəs61kəx ^w	go!

Fig. 33.--Syllabification of ɿ

II.20.3. Syllabic Offglide with ɿ

The forms of Figure 33 show the development of a syllabic offglide for ɿ in certain environments. Thus, 'half-brother' as against 'half'; 'I'm eating meat' as against 'eat,' etc.

On the other hand, while the offglide only develops where ɿ is followed by a voiced consonant, forms such as 'he got frightened,' 'scarred,' and 'a snack' show two complications. First, initial and pre-final ɿ before a voiced consonant do not develop the offglide; and second, these same forms show an 'inserted shwa.'

However, despite the evidence of the inserted shwas, it is by no means clear that shwa insertion precedes the insertion of the syllabic offglide for ɿ: if it did, we should derive (e.g.) **ʔélə⁷dəl⁷wəltx^w, instead of ʔél-ɿldəl⁷wəltx^w.

It must further be noted that, whereas the syllabic offglide develops in 'and me' and in 'half-breed' and 'big-heart,' it does not do so in 'go and wash!'. We must consider wəl ('and') enclitic to dəcəh ('I, me') in the phrase 'you and I,' just as 'half-breed' and 'big-heart' must be considered as phonological words.

The order of the rules must thus be:

1. Syllabic-ɿ rule, with positional constraints.
2. Shwa insertion rule.

The Syllabic-ɿ rule may be written:

$$\begin{bmatrix} +\text{Lat} \\ -\text{voice} \\ -\text{checked} \end{bmatrix} \longrightarrow [l] \begin{bmatrix} +\text{Lat} \\ +\text{Syll} \end{bmatrix} \text{ in env. } / \# [+seg]_1 - B [+seg]_1 \#^1$$

(1)

¹ # Stands for a word boundary, and [+seg]₁ means 'at least one segment;' thus the rule only applies within, and not at word boundaries. B represents b, d (but see Chap. II, sec. 20.5, where it is shown that b, d are still nasals at the point of application of this rule).

II.20.4. Shwa Insertion with Nominal and Stative

s-əbáded	mountain
s-ədebálał	ours
s-nəəkéyah	diving duck
s-əwəłós	chief
s-əłəp	covering
s-yəłəb	year
ʔas-báł	sated
ʔs-əbolóq ^w	round
ʔas-ədɔ ^ʔ	rotten
ʔs-əwəłək ^w	crazy
ʔas-məx ^ʔ	proud
ʔas-lepəc ^ʔ	covered
ʔs-yəłəx	gathered

Fig. 34.--Shwa Insertion with Nominal and Stative

As will be seen from the sample corpus in Figure 34, s- nominal and ʔas- stative are idiosyncratic in their behavior as 'preceding consonant' as regards shwa-insertion. For n and y-initial stems,¹ preceding s-nominal produces no shwa. With *ʔas- stative, no shwa is produced in conjunction with stem-initial m, b, l, and y.

II.20.5. Ordering of Shwa-insertion

It is clear from forms such as bəqsəd; q-əbəqsəd 'nose,' lepəc^ʔ; p-əlepəc^ʔ 'covered' that shwa-insertion must follow cluster-simplification. We should otherwise derive forms such as **bɔq-bəqsəd, whereupon the cluster-simplification rule would be rendered inoperative.

On the other hand, assuming that the underlying form for '1st person singular subject' is -čn,² the shwa-insertion rule must operate before the 'n-loss' rule; this is because, in a string such as hédab-dax^w -čə-x^w tél,³

¹No m-initial forms with s-nominal occur in the corpus.

²We assume non-root morphemes may be of the shape CC (see Appendix I, sec. 5.2).

³Chap. II, sec. 19, Fig. 31(d).

the environment for shwa-insertion only exists so long as the -n is still present.

A crucial form in the present argument is s-lánay; s-iánay 'woman.' From *s-lan-lánay we derive s-i²n-lánay, then s-in²-lánay. Now to derive the correct output, we must assume the operation of the 'n-loss' rule before the shwa-insertion rule, for we should otherwise get **s-lan²-lánay, from which the correct output is impossible to derive.

Thus we seem to require, for 'I went down,' the rule order:

1. shwa-epenthesis, then 2. n-loss : but for 'women'
1. n-loss, and then 2. shwa-epenthesis.

How are we to resolve this apparent contradiction in rule ordering? Noting that in 'I went down' the -n is stem-final, while in 'women' it is stem-internal, it is apparent that we have to do with a cyclical application of the rules. Taking the constituent 'stem,' we apply the rules in the order 1. n-loss then 2. shwa-insertion: this guarantees the correct output for 'women,' for -n will be lost. At the same time, a morpheme such as -nx^w or -čn will gain a shwa; thus hénam-nx^w-čn#. Taking next (on the second pass of the cycle) the next-largest constituent hédab-dax^w-čn# x^wtél, the n-loss rule now applies, giving correctly hédab-dax^w-čə-x^wtél.

But we have thus created a fresh problem. We have written hédab-dax^w-čn# x^wtél as the constituent that meets the second pass of the cycle; but we have continued to call the rule the 'n-loss' rule. It is clear¹ that the rule for change of obstruency (giving b,d for underlying m,n) must be delayed until the last pass of the cycle, which is accomplished by the simple expedient of marking that rule (and those dependant on it) as requiring the environment \$ - \$.² The spelling of the constituent given above is thus correct, insofar as it is a complete utterance.

It remains to point out that the form for 'women' (s-iáday) also enables us to determine the relative ordering of the glottal-absorption and n-loss rules. Clearly, if we assume there is a stage s-in²-lánay, then the glottal stop must be absorbed before n-loss, for we should otherwise get an output such as **s-i²-láday.

¹ Provided we insist on the interpretation given above (Chap. II, sec. 19), which motivated our placing of this rule before change of obstruency.

² \$ represents 'utterance boundary.'

The order of the rules here referred to is thus:

1. Glottal-absorption.
2. n-Loss.
3. Shwa-insertion.
4. Change of obstruency.

II.21. Irregular Stress

II.21.1. General

	<u>Non-Possessive</u>	<u>3rd Sg. Possessive</u>	<u>Gloss</u>
(a)	s-péx ^w	s-péx ^w -s	gull
	hədəq ^w	hədəq ^w -as ~ hədəq ^w -s	hump-backed salmon
	təb ² x ^w	təb ² x ^w -s	gooseberry
	təbéx ^w	təbéx ^w -s	land
	sələx ^w	sələx ^w -as	hunter
	čátas ~ čatás }	čátas	stone
	čaláš ~ čálaš }	čaláš-as ~ čálaš-s }	hand
	čəʔwáš	čəʔwáš-s	wife
	šólás ~ šəl·ós }	šólás	fish
<hr/>			
		<u>Augmented</u>	
(b)	ʔəs-xədəq ^w -če	ʔəs-xəd-xədəq ^w če ~ ʔəs-xəd-xədəq ^w če }	hurt hand
	ʔəs-ləwáʔldəb	ʔəs-loʔ-ləwáʔldəb	left behind
	ʔəs-cəlʔəp	ʔəs-cəlʔ-cəlʔəp	smothered
	ʔəs-x ^w eʔəq	ʔəs-x ^w eʔ-x ^w eʔəq	passed
	sq ^w əháp	sq ^w -sq ^w əháp	tree-stump
<hr/>			
(c)	šctay	šct-čtáy ~ šct-čə́tay }	pan
	spqálšəd	spq-pqálšəd ~ spq-pə́qalšəd }	foot

(c) cont.

<u>Non-Possessive</u>	<u>Augmented</u>	<u>Gloss</u>
ʔas ^w áx ^w	tsx ^w -ax ^w áx ^w	elder
tx ^w áʔwas	$\left. \begin{array}{l} xw-txwáʔwas \\ \sim xw-táxwáʔwas \end{array} \right\}$	enemy
<u>Unaugmented</u>		
(d) wəq ^w ʔtəb	q ^w -əwəq ^w áʔtəb	drifted
pəl ^w ʔəq ^w	pəl ^w ʔ-pəl ^w áq ^w ~ pəl ^w ʔpəlaq ^w	gravel-cook
s-x ^w éʔay	s-x ^w éʔ-x ^w əʔay ¹	sheep
s-q ^w ópčəlʔəs	$\left. \begin{array}{l} s-qwó-qwápčəlʔəs \\ \sim s-qwo-qwápčəlʔəs \end{array} \right\}$	stick, cane
(e) s-q ^w ópčəlʔəs	s-q ^w ó-q ^w ápčəlʔəs ²	stick, cane
š-čəʔál-ał	š-čəʔ-čayl-ał	baby
təʔas-pəwče	təʔas-pó-pewče ²	follower
ʔópədəčs	ʔóp-opədəčs ³	ten(by ten)
dəhqas	dáqs	one(by one)

Fig. 35.--Irregular Stress

¹For the reduplication to be s-x^wéʔ, we must postulate *s-x^wəy^wəʔay; *s-x^wəy-x^wəy^wəʔay. We are quite unable to explain the loss of -y- in the Augmented form. But see Note 94, Appendix I, sec. 5.

²The loss of 'C₂' in 'stick,' and of the expected glottal stop in 'follower' is not well understood. For the latter we derive *te-ʔas-pew-pəwče, then tʔs-pʔw-pəwče, then tʔs-poʔ-pəwče, then stress-shift to tʔs-póʔ-pəwče.

³See Chap. II, sec. 14.

It remains to consider, albeit tentatively, the problem of certain stress-irregularities which appear to contradict some of the conclusions given above. We shall show evidence that at least four different phenomena are involved, these being stress allomorphy in dictionary entries, non-operation of the stress retraction rule for augment, secondary stress-shift, and stressing of the reduplicating syllable.

II.21.2. Stress Allomorphy

First, it is noted that many disyllabic stems, in citation as well as in the texts, have freely alternating stress.¹ Such are x^wesqam 'few'; łok^wał 'moon, sun; s-ʔobat 'name'; sedaq 'fly'; ɸestab 'all, everything.' Figure 35 consists of a sample of those forms showing stress-alternation in contexts where it is possible to show which must be considered the underlying stress; from such forms we are able to shed some light on the general nature of the problem.²

Sub-corpus (a) gives forms which effectively 'control' the underlying stress and spelling of selected dictionary entries such as hədəq^w 'hump-backed salmon.' By comparison with s-ɸéx^w-s, which was earlier (p. 89) re-spelled³ *s-ɸéxw, we see that we could explain the alternation hədəq^w-as hədəq^w-s by re-spelling the latter as hədəq^w-s. Similarly, we might re-spell the forms təb^ʔx^w and təb^ʔx^w as *təb^ʔxw and *təb^ʔxw.⁴

However, consideration of the forms čátas ~ čatás 'stone' and čálaš ~ čalás 'hand' suggest another possibility. The allomorphy which we assigned to the spelling of the earlier forms may well, at least for the non-monosyllabic forms, in fact be an allomorphy of stress.

The expression 'allomorphy of stress' implies that we assign the alternation to the dictionary entry itself. But this is by no means an inevitable choice. For the forms given, we have no criterion within Twana, but it is not implausible to assert that a very late optional stress-shift rule⁵ is responsible for an output such as čəʔwáš-s (instead of čəʔwáš-as).

¹But compare ʔélal 'sing'; ʔelál 'weep'; bə́tab 'murdered'; bə́təb 'warm';

²The problem is extremely important from a comparativist's point of view, too, since there are stress alternations between (e.g.) Twana and Nisqually. Further internal reconstruction of the kind here attempted should offer a starting point towards understanding the comparative situation.

³'Re-spelling' of course implies re-analysis; here, a single segment is re-interpreted as two segments.

⁴See Chap. IV, sec. 3.5 for the bearing of this re-analysis on the question of *x in Twana.

⁵The affix-truncation rule operates at earliest during the second pass of the cycle; it is quite possible that the secondary stress-shift is in fact a post-cycle rule.

II 21.3. 'Not Retraction Rule'

Sub-corpus (b) of Figure 35 gives forms showing another aspect of stress-alternation. In these cases, the stress has not shifted, when we expect it to do so. According to the stress-assignment rules, stress retracts to the first syllable of the stem when the augment is present. Here, other details aside,¹ the rule has failed to operate, so that the augmented form of (e.g.) *ʔəs-cəlʔəp* 'choked' is *ʔəs-cəlʔ-cəlʔəp* instead of the expected ***ʔəs-cəlʔ-cəlʔap*.

It is not clear² from the total corpora for Twana whether we must consider the stress-retraction rule to be optional, or whether the forms concerned must be marked in the dictionary as [not augment-retraction rule].

While the existence of doublets for forms such as (sub-corpus [c]) 'pan' and 'foot' tends to confirm that we have to do with either a rule option or an exception to a rule, there is still a further possibility, viz., that we have to do with further cases of CC-stems,³ or with CC ~ CəC- stem allomorphy. For 'pan' and 'foot,' stem allomorphy is suggested; we recall that the shwa will not appear in the output of the unmarked form, where it falls between voiceless consonants. For 'elder' we have to do with a (unique) case of reduplication of a compound prefix.⁴ No vowel is hypothesized for this prefix. For 'enemy,' a similar morpheme-structure is supposed,⁵ again without vowel in the prefix.

¹ *xədəq^w-ačə, *iVwálVdab, *cələp, *x^wəyəq are reasonable underlying forms.

² Despite the alternation in 'hurt hand.'

³ See p. 47. Compare the argument on s-xpáb (Chap. II, sec. 4). The case for holding that all Twana roots are (minimally) C V C is calibrated, not contradicted, by the existence of forms like š-čtáy; š-čt-čtáy 'pan'. For the shapes of morphemes, see Appendix II, sec. 2, Fig. 76. There is only one other form like 'pan,' and it is not clear whether we must modify the C.S. rule for reduplication or employ dictionary markings for the two cases.

⁴ t- article; s- nominal(?); x^w- human agent; xáx^w root.

⁵ t- article; x^w- human agent; ʔwás (or hwás) root. It is recalled that nominal and derivative prefixes do not elsewhere partake of reduplication.

If we here concede, contrary to our former assertion, that CC stems occur in Twana, then the Constituent Structure rule for reduplication must be modified accordingly: it must allow CC¹ as well as CVC to reduplicate.

II.21.4. Secondary Shift

Sub-corpus (d) shows the most interesting of all the stress-alternations, viz., a secondary shift back to the (unaugmented) stem-stress.² Deriving the output of (e.g.) augmented *pəl-pəláq^w,³ we get pəl-pəláq^w, then pəl-pəlāq^w by the ablaut rule for vowels under secondary stress. We should then derive p¹l-pəlāq^w, then pl²-pəlāq^w; then pəl²-pəlāq^w. Note that we cannot hold that in pəl²-pəlāq^w the stress has failed to retract; for it is only through this retraction that the original shwa loses one degree of stress and thus is ablauted to a. We must therefore assume that the stress has first retracted, giving a, and later shifted back to its original position.⁴

As with the forms of sub-corpus (b), it is not clear just where the (optional?) rule for this secondary stress-shift should operate; certainly after the ablauting of vowels under secondary stress, and also after the vowel-loss rule. If stress-reversion preceded ablaut, we would not get an a vowel in the stem; if it preceded vowel-loss, we would then get **pəl²-pəl²áq^w (as in the unaugmented form). Further, the secondary stress-shift must follow glottal metathesis and the semi-vowel rule for we should otherwise not get shapes like ʔastóʔ-čəwəb⁵ (e.g.).

The rule has the shape:

$$\begin{array}{l} \text{Secondary} \\ \text{Stress-} \\ \text{Shift:} \end{array} \left[\begin{array}{c} \text{-Cons} \\ \text{+Voc} \\ \text{+Stress} \end{array} \right] \left[\begin{array}{c} \text{+Cons} \\ \text{-Voc} \end{array} \right] \left[\begin{array}{c} \text{-Cons} \\ \text{-Voc} \\ \text{+Stress}^2 \end{array} \right] \rightarrow \begin{array}{c} 1 \qquad 3 \\ \text{[-Stress][2][+Stress]} \\ \text{opt.} \end{array} \text{(Aug)}$$

¹But note the special conditions on laryngeals.

²Comparison with ʔas-cəl²əs; ʔas-cəl²-cəʔlas 'rattled' suggests that there is no purely phonological explanation for the anomaly.

³See pp.74ff. The unaugmented form is pəl²áq^w, with 'secondary' glottal stop.

⁴We have in a sense recaptured the notion of 'analogical levelling,' here under the influence of the unmarked form.

⁵Compare unaugmented ʔas-tóʔwəb 'guessed.'

Since such a stress alternation occurs only with forms having original secondary stress, the necessary environment here is, perforce, 'in a vowel having secondary stress.' This confirms the position taken on the vowel ablaut rule given earlier (Chap. II, sec. 4).

Two forms in the corpus show a further process at work. Assume (as we shall show below that it must be assumed for the forms of corpus [d]) that 'stick' has its stress somehow assigned to it by the stress-assignment rule for augment, giving $s-q^w \acute{o} + \text{stem}$. It is now not difficult, from the argument above, to explain how the vowel in the first syllable of the stem comes to be a. We must simply assume that this syllable now has secondary stress, so that the vowel ablaut rule will operate.

II.21.5. Stressed Reduplication

Figure 35(e) presents four cases where the reduplication is (apparently) anomalously stressed. In the first two cases, the first stem vowel, as mentioned above, is treated as being secondarily stressed; thus a-vowels appear, for original shwa and o respectively.¹ For 'canes' and 'babies' we must assume that the primary stress has been assigned to the reduplication, but by a rule operating on a structure of the shape Redup'n & stem,² or by some kind of option in the stress-assignment rule, which allows the reduplicating syllable to have primary stress.

In the forms for 'follower' and 'ten by ten,' the stress-shift could well be of the same type as that shown above (Chap. II, sec. 15.6) in affixes for forms such as $sal\acute{a}h-s \sim sal\acute{a}h-\acute{e}s$ 'his life.'

II.22. Rule Summary 4

1. Constituent structure.
2. Stress-assignment.

¹ $*s-q^w \acute{o}p\acute{c}VIV\acute{s}$, where V V are not recoverable (but perhaps $\leftarrow \acute{c}\acute{a}l\acute{a}\acute{s}$ 'hand?'); and $*c\acute{a}y\acute{a}l-ak$.

² It is implied that the proper structure for Augment may well involve stressed CVC reduplication; the stress-assignment rule could then optionally or exceptionally assign (primary) stress to 'the first stress' in the constituent 'Augmented stem.'

- **3. Loss of stem C_1 , C_2 laryngeals, in Augment reduplication.
- **4. Augment metathesis (laryngeal stems).
- 5. Vowel-a mutation.
- *6. Affix truncation.
- 7. Ch metathesis.
- 8. Laryngeal affection.
- 9. Vowel assimilation.
- 10. Affix stress shift (option)
- 11. h unvoicing of l.
- **12. Opt. V-loss in /-laryngeal+identical vowel.¹
- 13. General Vowel-loss \longrightarrow h.¹
- 14. $h \longrightarrow \left\{ \begin{matrix} \emptyset \\ ? \end{matrix} \right\}_2^1 / \left\{ \begin{matrix} \text{voiceless stop} \\ R \end{matrix} \right\}_2^1$
- 15. Glottal metathesis.
- 16. Y-metathesis
- *17. Semi-vowels syllabify.
- **18. Secondary stress-shift.
- 19. Glottal absorption.
- **20. n-loss.
- 21. Cluster simplification.
- 22. s-assimilation.
- 23. Geminate simplification.
- **24. t gains syllabic offglide.
- *25. Shwa insertion, generalized
- 26. $N \longrightarrow \overset{N}{B}$, except in / - & dissimilar N
- 27. $\overset{N}{B} \longrightarrow B$, except (opt.) initially.
- 28. $\overset{?}{B} \longrightarrow B$.
- 29. h-losses, not clearly ordered.

Note: N = Nasal

B = Voiced obstruent

R = Resonant

* shows rules modified

** shows rules added (cf. Summary 3, Chap. II, sec. 16,

¹

Ordering of Rules 12/13 clarified at Chap. III, sec. 4, 'Options.'

CHAPTER III

THE ATTENUATIVE

III.1. Introductory

III.1.1. Survey of Vowel Contrasts

ǂéc-	ǂáǂ	ǂóc	ǂǎǂ
milk	sew	float	ordure
téq ^w	táq ^w	tóq ^w	tǎq
play	lick	find	closed
ǂél	ǂáǂ	baǂóǂ	ǂǎǂ
lazy	night	pus	win
q ^w ést	k ^w ǎǎ	tk ^w ós	k ^w ǎǎ
cow	cut	seven	count
sél	ʔasále(h)	sólʔ	
rag, cloth	two	go	
bét	bád	bótʔ	bǎtǎb
díme	father	suckle	murdered
yéǂ	yáǂ ^w	yóǂ ^w	yǎǂ ^w
squeak	turn back	rot	wash
ʔéx	ʔǎǎcad	ʔóx ^w sǎb	ʔǎǎcad
scrape	bed	buy wife	clear the throat
hédʔ	s-háboh	ʔas-hóǂǎǎd	
long time	tale	mallard	
s-ǂ ^w ǎléb-as	dǎx ^w -ǎléb-ǎs		
his drying-rack	his life ¹		
ho-hóʔb-as	hǎhǎʔ	heʔódǎx ^w	heʔǎǎdǎx ^w
red bluff	many ²	come on	he was coming ³

Fig. 36.--Vowel Contrasts

¹*ǎdx -hǎléh-bd-as, giving dǎx^w-ǎléǎd-s, etc.

Fig. 36.--cont.

²*h⁶?, with 'laryngeal-affection' (Chap. II, sec. 15.3) and vowel-assimilation (Chap. II, sec. 15.5).

³See above, for the aspectual constituent -h- (Chap. II, sec. 15.9).

As will be seen from the data in Figure 36, it is necessary to provide for six vowels in output forms in Twana. Quite apart from the question of so-called 'length,' this is not to say that it will be necessary to employ six vowels in underlying representations. However, it is as well to tentatively assign features sufficient for the segments of the output forms, before attempting to show which segments must be considered 'secondary.'

From what has been said concerning 'laryngeal affection,' it is clear that at least two vowel heights will be required.¹ Since h is compact,² let us for the moment call these heights compact and non-compact.

The feature-definition of the distinctions between e, ə, and o, and between ɛ, a, and ɔ respectively are for the moment not so clear. For the operation of the 'laryngeal-affection' rule, the vowels e/ɛ, ə/a, and o/ɔ must obviously be paired. So far as ə/o and a/ɔ are concerned, we tentatively adopt the feature of roundness;³ this suggests that the proper features for the vowels must also include gravity, which will distinguish o, ɔ, ə, and a from e and ɛ. The following feature-matrix (Figure 37) shows this tentative division; for clarity, all other features are omitted.

The various environments in which the compact vowels ɛ and ɔ are derived from the corresponding non-compact e and o (Chap. II, sec. 15.3) have

¹We shall consider later, in the comments concerning vowel allophony, the question of height (Chap. IV, sec. 3.3).

²Again, recalling that h will be fully specified, the fact that its compactness is redundant is of no relevance. On the contrary, the use of this feature in the 'laryngeal-affection' rule makes that rule correspond entirely to the notion that we have to do with assimilation of compactness.

³We shall refer to allophonic variants later (Chap. IV, sec. 4.2); in particular, shwa has many allophones, especially when unstressed. The identification here is simply auditory-impressionistic.

	o	ɔ	ə ¹	a	e	ɛ
Grave ²	+	+	+	+	-	-
Round	+	+	-	-	-	-
Compact	-	+	-	+	-	+

Fig. 37.--Tentative Distinctive Features for Twana Vowels (matrix)

¹From the discussion above (Chap. II, sec. 4) it is clear that shwa, both stressed and unstressed, will necessarily appear as a segment in dictionary entries, regardless of the fact that many occurrences of shwa in output forms are predictable (i.e., inserted by rule). Compare the remarks of Swadesh (1952), Kinkade (1963-64), Snyder (1968).

²See Chap. IV, sec. 3.3 for re-definition.

been shown. We have also shown¹ some important sources of the sequence $\hat{V}?$, with which the sequences $e?$ and $\omega?$ are thus potentially in contrast. It remains to clarify some of the sources of the sequence $V_1?V_1$; it will then be possible to examine the analogous sequences ($\hat{V}?$ and $V_1?V_1$) found in Attenuative formations.

III.1.2. Survey of $V_1?V_1$ Sequences

As will be seen from the forms in Figure 38, there are a number of ways in which the sequence $V_1?V_1$ can arise in Twana. Sub-corpus (a) gives a sample of transitive verbs with singular (unmarked) object. First recall (Chap. II, sec. 4) that the transitive stem-formative morpheme is a copy of the root vowel: then for the case of roots of the shape $CV_1?$, the sequence $V_1?V_1$ arises.

¹In stems, as in $\acute{q}\acute{a}be$; $q\acute{a}-\acute{q}\acute{a}be$ 'girl,' $s-\acute{c}\acute{a}qe$ 'sock-eyed salmon'; and, as a result of glottal-attraction, as in forms of the type $\acute{c}\acute{a}yat$; $\acute{c}e\eta-\acute{c}\acute{a}yat$ (p46ff), as well as the type $s-q^w\acute{a}b\acute{a}y$ (with glottal-stop from an h-cluster (Chap. II, sec. 15.4)).

- (a) teʔé-čəd I'm ringing (a bell)
 be-daʔá-dəx^w-čəd I'm making a foot-print¹
 poʔó-də-bət-dəx^w I'm passing wind²
 čəʔé-dəx^w wet it!
-
- (b) *s-ədəʔ-óbəš ~ s-ədoʔóbəš it's theirs
 *ʔaʔ-əxəd ~ ʔaʔ-əxəd hunting
 *čəʔ-éwad ~ čəʔ-éwad wet inside
-
- (c) be-ʔéwad I'm inviting
 be-ʔexé-čəd I'm scraping³
 be-ʔəsp^wəb-čəd I'm smoking (tobacco)
-
- (d) be-ʔeʔéʔalʔ-čəd I'm humming⁴
 be-ʔeʔéla-čəd I'm eating slowly
 ʔoʔócay very slow
-
- (e) be-čáʔalbəčə-čəd I'm listening to you⁵
 *aʔššs rock-cod
 šayaʔáp shopping-basket
 ʔeʔéi yonder
 ʔoʔótxs ocean canoe
 hoʔólʔ really
 qoʔóləh loon
 kaʔəh mother
 məʔəh dad
 q^wasəʔex^w porpoise⁶
 xʔéʔč dentalium⁶
 déʔéi still, despite⁶
 s-tʔʔb dog-salmon⁶
 čʔʔs three⁶
 q^weiʔʔy ~ leaf^{6,7}
 q^wéiəʔy

Fig. 38.--V₁ V₁ Sequences

¹For the stem *daʔ, compare Chap. II, sec. 17.3.

²Compare póx^w- 'blow': if this is connected, then it constitutes one of the very few instances of an alternation p ≠ β; d = transitive; bət = reflexive.

Fig. 38.--cont.

- ³ Compare s-px^w 'b' 'smoke.' Possible from *^wéi-s-pox^wób-čəd; but compare be-^wéi-šəlós-čəd 'I'm eating fish,' and ^we-ə-ásqx^w 'good smell' (*^wéy-^wásqx^w); ^was-ədə^w-álx^w 'rotten smell' (*^was-dó^w-álx^w).
- ⁴ Compare Coeur d'Alene, where 'diminutive' consists in glottalization of every 'resonant' in the word. See Reichard, par. 614. The present form may be a relic case of a once-productive rule of that kind.
- ⁵ -cè- is an allomorph of 2nd singular object.
- ⁶ See Chap. III, sec. 7.2. Simple Infix Atten.
- ⁷ Compare ^wélo(h) 'cedar-bark,' and ^wéle 'cedar tree.' ^wéle most likely is from *^wéloh-ay(?). It is not clear just how (if at all!) ^wéi^w is related to these, although it appears as if h-assimilation has occurred. -ay(h), 'growing thing.'

A second source (sub-corpus [b]) of $V_1^?V_1$ is through vowel-assimilation (Chap. II, sec. 15.5): again, the stem must be glottal-stop final, although the assimilation may operate progressively (*^wq^wól-as give ^wq^wól^ws) or regressively (s-ədə^w-óbəš gives s-ədə^wóbəš).

Thirdly (sub-corpus [c]) $V_1^?V_1$ may result by chance collocation; for example, it arises when the (neutral) aspect marker be- is used in conjunction with any stem of the shape ^wé-, as in be-^wélal-čəd 'I'm singing' be-^wéla-čəd 'I'm eating.'

A fourth source (sub-corpus [d]) of $V_1^?V_1$ is the 'CV' reduplication of the Intensive, which thus gives, for glottal-stop initial stems, forms such as ^wo-^wócay 'very slow' (from ^wócay 'slow'); be-^we^w-é-la-čəd 'I'm eating slowly' (from be-^wéla-čəd 'I'm eating')

A fifth source (sub-corpus [e]) of $V_1^?V_1$ consists of (as yet) unanalyzed stems containing the sequence, e.g., ^wo^wót^wxs 'ocean canoe.'¹ For this type most of the examples so far obtained are cited in the corpus.

¹ Such forms may possibly prove to be examples of (a) complex stems with vowel assimilation (compare Nisqually ^wé^wót^wxs), or (b) complex stems containing $V^?eh$ or $V^?oh$, with vowel-assimilation (see Chap. II, sec. 15.5).

III.2. Types of Attenuative

In discussing the question of the source of the vowels in the Attenuative, it must be shown what is the appropriate underlying structure that may be assumed, as well as how alternations exemplified by $sk^w\acute{e}d\acute{o}b$; $sk^w\acute{e}^?e-k^w\acute{o}d\acute{o}b$ 'chicken' but $s\acute{e}l$; $s\acute{e}^?-s\acute{o}l$ 'rag,' and $k^w\acute{o}p\acute{e}c$; $k^w\acute{o}p\acute{e}^?ca\acute{l}$ 'master' come about.

As in the case of the Augmentative,¹ the semantic correlates pertaining to Attenuative constitute a small set of markings. For lexical items glossed by (English) nouns, Attenuative is equivalent to 'diminutive.' Thus:

$\acute{c}álaš$	'hand'	$\acute{c}a^?á-\acute{c}álaš$	'little hand'
$s-láday$	'woman'	$s-l\acute{a}^?á\acute{l}ide$	'girl'
$páce$	'digging-stick'	$pa^?ápce$	'little digging-stick'

But Diminutive may also be used affectively, to denote 'small, and feminine,' as in

$q\acute{a}l\acute{o}b$	'bad'	$q\acute{a}^?e-q\acute{a}l\acute{o}b-\acute{c}ad$	'bad little me' (fem.)'
$\acute{l}áwalbaš$	'Indian'	$\acute{l}a^?á-\acute{l}áwalbaš$	'little Indian girl'

Some kinship terms are inherently Diminutives, as:

$s-y\acute{a}l\acute{e}^?e\acute{c}^2$	sibling, cousin	$s-y\acute{a}l-^?y\acute{a}l\acute{e}\acute{c}$ (pl.)
$\acute{c}ab\acute{e}^?eq^w$	grand-relation	$\acute{c}ab-\acute{c}ab\acute{e}q^w$ (pl.)

For lexical items glossed by English verbs, the Attenuative sense may belong to the action or the object. Thus:

$be-\acute{r}^w\acute{a}š-\acute{a}-\acute{c}ad$	I'm cutting things:	$be-\acute{r}^w\acute{a}^?á-\acute{r}^w\acute{š}\acute{e}-\acute{c}ad$ ³	I'm cutting a little, I'm cutting things small
$be-^?é\acute{l}a-\acute{c}ad$	I'm eating :	$be-^?é^?e-l\acute{a}-\acute{c}ad$ ³	I'm having a snack
$be-\acute{c}x^w\acute{e}-\acute{c}ad$	I'm slaughtering :	$be-\acute{c}é^?e-\acute{c}x^w\acute{e}-\acute{c}ad$ ³	I'm slaughtering little ones, or I'm slaughtering unimportant ones

¹ See Chap. II, sec. 2.

² $^?y\acute{a}l\acute{e}\acute{c}$ is obviously the underlying form; with $^{**}y\acute{a}l\acute{e}\acute{c}$, the Augmented form would show the V-a rule, giving $^{**}y\acute{a}l^?y\acute{a}l\acute{e}\acute{c}$.

³ For the stem-final shwa, see Chap. II, secs. 19, 20.

We recall that the proper underlying forms for the Augment were not the output forms of the unaugmented stem, but rather the same underlying shapes as were found necessary for the proper development of the unaugmented forms themselves: we formalized this conclusion by saying that the rules operated not on roots but on whole stems. It will become clear that the Attenuative, too, is to be considered a (derived) stem.

As in the treatment of the Augment, all stems in 2/h are temporarily laid aside and will be treated later. Non-monosyllabic stems are treated before monosyllabic stems.

III.3. Constituent Structure and Rules

III.3.1. 'Length' vs. Constituent {Vh}

	<u>Non-attenuative</u>	<u>Attenuative</u>	<u>Gloss</u>
(a)	čálaš	ča'á-čələš	hand
	s-láday	s-la'á-ɬde	woman
	láwalbəš	la'á-ləwəlbəš	Indian
	səbáded	s ba'á-bəde	mountain ¹
	s-k ^w átad	s-k ^w a'á-k ^w əd	rat
	tas-á-čəd	ta'á-tsəčəd	hit ²
	x ^w ac-á-čəd	x ^w a'á-x ^w cə-čəd	lift ²
	táɬqəb-čəd	ta'á-taɬqəb-čəd	holler ³
	sáx ^w ab-čəd	sa'á-sx ^w əb-čəd	jump
	k ^w ápab-čəd	k ^w a'á-k ^w pəb-čəd	correct
(b)	páce	pá'a-pce	digging-stick ^{4,5}
	qále	qa'á-ɬle	tump-line ⁵
	bále	bá'a-bəle	roe ^{4,5}
	ká-kə(h)	ka'á-kkə(h)	crow ⁶
	s-pá'čə	s-pá'čə-pčə	basket ⁵
	sáx ^w o	sá'á-sx ^w o	urine (male) 5,7
(c)	sátad	sá'á-slad	food
	s-téq ^w ab	s-tá'čə-tq ^w əb	toy
	s-k ^w édəb	s-k ^w é'čə-k ^w ədəb	chicken
	šedáq-čəd	šé'čə-šədəq-čəd	fly (1 sg.)

Non-Attenuative	Attenuative	Gloss
lék ^w a-čəd	lé'ε-1'k ^w ə-čəd ~ 1ə'ε-1'k ^w ə-čəd ~ 1ə'ε-1'k ^w ə-čəd }	speak (1 sg.) ^{8,9}
ceq ^w éb-čəd	cé'ε-cq ^w əb-čəd	dig (1 sg.)
x ^w ecós-ı	x ^w é'ε-x ^w cs-ı	quarrel (ı.pl.)
(d) s-q ^w ábáy?	s-q ^w é'ε-q ^w əbe	dog ¹⁰
s-x ^w əde	s-x ^w é'ε-x ^w əde	bull-head
s-q̌q̌əle	s-q̌é'εq̌əle ~ s-q̌é'ε-q̌əle	elk, animal ¹¹
s-páhq ^w ı	s-pé'ε-pq ^w ı	waterfall ¹²
wəq̌əb	wé'ε-?wəq̌əb	box
ťkáyas	ťé'ε-ťke?əs ~ ťé'ε-ťke?əs	basket ^{13,14}
s-xpáb	s-xé'ε-xpəb	cockle ¹⁵
qələb-čəd	qé'ε-qələb-čəd	bad (1 sg.)
šəx ^w ab	šé'ε-šx ^w əb	wind
(e) x ^w oyób	x ^w ə'ə-x ^w əyəb	sell ¹⁴
xoq ^w ób	xə'ə-xəq ^w əb	dip
x ^w oq ^w ób	x ^w ə'ə-x ^w əq ^w əb	snore ¹⁴
ťoq ^w ób	ťə'ə-ťəq ^w əb	pick up
šo'əób	šə'ə-šə'əb	grind
š-čótax	š-čə'ə-čtx	halibut
x ^w ə'əbat	x ^w ə'ə-x ^w əbat	paddle

Fig. 39.--Attenuative, Non-Monosyllabic

¹As with the augmented form, the final -n is lost in Attenuative; an excessively rare and ill-understood phenomenon.

²*tas-á-d-čd. -d is the transitive morpheme. See n-loss (Chap. II, sec. 19). In these forms -n is of course stem final.

³For the surviving vowel in the stem, assume *tálVq-ab.

⁴For the stress-shift, see Chap. II, sec. 15.6. Note that the vowel-loss rule operates regularly, 'counting' from the position of stress after stress shift.

⁵*s- pə'čw, *səx^w, or *s-pə'čoh, *səx^woh.
*pacy, *qály, *bály; or *páceh, *qáleh, *báleh.

Fig. 39.--cont.

- ⁶The root is probably *k^h. The stem is inherently CVC reduplicating, with 'laryngeal affection' in the first syllable.
- ⁷Gender is found in the Article, a few 'affective' Attenuatives, and a few suppletive stems.
- ⁸For the glottal stop by vowel-loss, see Chap. II, sec. 12.3.
- ⁹For loss of unstressed vowel in l^əʔ^h-l^ək^w-čad (later replaced by shwa), see Chap. II, sec. 17.2 ~ l^əč- Cp. fn. 13 below.
- ¹⁰For loss of final glottal stop, see Chap. II, sec. 15.4.
- ¹¹Loss of glottal stop in V^ʔV₁. Perhaps better, an option on insertion.
- ¹²*s-p^hq^wə. See Chap. II, sec. 15.7 (esp. end).
- ¹³Vowel-loss leaves t^əč-čkyʔs, explained at Chap. II, Sec. 12.3.
- ¹⁴For the stress-alternation, see Chap. II, sec. 15.6.
- ¹⁵*s-xapáb, discussed at Chap. II, sec. 4.

Considering the forms given in Figure 39 (a), Twana Attenuative might be simply defined as C₁V₁^ʔV₁ plus stem. Were all Twana Attenuatives of similar shape, the problems remaining would be the proper interpretation of the sequence V₁^ʔV₁, and the nature of the stress-retraction seen in one or two forms such as páce; pá'apce 'digging-stick.'

Inspection of the forms of the remaining sub-corpora, however, shows that this is by no means the whole story. Why, in the first place, are the vowels in Attenuatives corresponding to non-a stems not similarly copies of the stem vowel? Let us initially assume that all Attenuatives are in fact alike in their underlying structure, implying by this supposition that 'Attenuative' involves some process which affects all the vowels alike, but by its very nature does not change the vowel a. The notion that the process involved is simply 'length' is hardly sufficient, even did we suppose that 'length' is somehow automatically accompanied by a 'component of 'lowering.'¹

¹For Upper Chehalis, which seems to show a parallel situation,

To say that e' and o' are lowered here is true, but is hardly an explanation that relates the phonology of these forms to anything else in Twana. What is even worse, there is no plausible sense in which one may assert that $e'e$ is related to a' by lowering. A more plausible account of the relation between e/o and $e'e$, $o'o$ would perhaps make use of the already-established properties of h .

Recall that $ʔ/h$ exercise a lowering effect which we have named 'laryngeal affection', giving e for e' , and o for o' ; the possibility then suggests itself that we might supply an h in the constituent structure of Attenuative. Suppose we now set up Attenuative as $C_1 \bar{V} \cdot h \& \text{stem}$: then assuming laryngeal-affection to operate just as if the vowel were short, forms such as sélad; sé'eslad could be derived, setting aside for the moment the questions of vowel reduction, shwa-insertion, and the glottal stop in the reduplicating syllable. This begins to look acceptable.

However, the case of shwa-stems immediately makes such a simple formulation untenable; for, by the laryngeal-affection rule, a form such as $\acute{s}éx^w ab$ 'wind' should give $^{**}\acute{s}áʔa-\acute{s}éx^w ab$, whereas the correct output form is $\acute{s}é\acute{e}-\acute{s}x^w ab$. Thus a' is behaving in the same way as e' .¹ which is to say that, while there are four 'short' vowels (e , a , o , and a'), there are only three 'long' vowels (e' , a' , and o').

The question now arises, how do we explain the implication that there has at some point been a merger of a' and e' ? The fact that the putative merger has occurred almost entirely within the domain of Attenuative suggests strongly that this merger is recoverable, that is, that we expect to be able to devise suitable rules to produce it within the grammar.

A rule producing the required merger of e' and a' is easily written, from a formal point of view. However, we should prefer, in dealing with any phonological idiosyncrasy, to show some rationale for the processes involved. We thus propose to interpret the putative merger under discussion as result-

Kinkade (1964, pp. 256-267) says: 'Most diminutives are formed by adding a phoneme of length to the stressed vowel of the stem.' The difficulties attending this assumption in Kinkade's analysis will be discussed elsewhere.

¹And not as ' a plus "something"'; $a'hC$, we recall, gives $a'hC$ (Chap. II, sec. 15.3).

ing from a constraint on certain non-consonantal sequences, just as we showed the Augment cluster-simplifications (Chap. II, sec. 7) to result from constraints on consonantal sequences.

We have defined *h* as a continuant voiceless semi-vowel; *e* as a non-compact, non-grave, non-rounded vowel; and *shwa* as a non-compact, grave, non-rounded vowel. We now suggest that the constituent structure of Attenuative be defined as $C_1 V_1 \acute{V}_1 h$ & stem.

III. 3.2. The VV Merger

The sequence above specifies schematically the set of possible sequences in Attenuative reduplication. Recall, first, the constraint on the sequence 'non-compact vowel plus *h*';¹ for *shwa*, the constraint operates only with a following consonant. But the sequences in Attenuative are all of the shape $-V_1 \acute{V}_1 h$ & C, however, so that *shwa* may here be considered as quite similar to *e* and *o*, in respect to laryngeal-affection. Now since *a* is compact, *aáh* is not expected to undergo change; and in fact, only $C_1 a^? \acute{a}$ is derived from *a*-stems. We thus limit our attention to the non compact vowels, *e*, *o* and *ə*.

Since laryngeal affection is responsible for the change of compactness, it is not clear whether the sequence-constraint to which we wish to attribute the (now spelled) *eé* / *əś* merger necessarily involves $V_1 \acute{V}_1 h$ or merely $V_1 \acute{V}_1$. The parallel with the behavior of consonant clusters² suggests that perhaps the sequence concerned is indeed VVh. On the other hand, the fact that the sequence VV only occurs in the environment of *-h* implies that we do not need to refer to *-h* in the rule.³

Tentatively, the constraint here might be interpreted as a constraint on gravity in stressed non-compact vowels: 'in a sequence of two non-compact vowels, the second member assimilates its gravity to the roundness of the first.' Using Greek letters to denote variables which range over binary

¹Part of the motivation for assuming stress on the second vowel of reduplication is the desire to leave the laryngeal-affection rule unchanged. The reason for assuming two vowels instead of adding the feature 'length' will be apparent later (Chap. III, sec. 3.3).

²Where the constraint was on certain sequences of 3 segments (Chap. II, sec. 7).

³But see Chap. III, sec. 6.2.4 'Laryngeal-final stems' for a re-appraisal.

values of phonological features, the dependency of gravity on roundness may be formalized as follows:

$$\begin{bmatrix} -\text{cons} \\ +\text{voc} \\ -\text{compact} \\ +\text{stress} \end{bmatrix} \rightarrow [\alpha \text{ grave}] \text{ in env. } / \begin{bmatrix} -\text{cons} \\ +\text{voc} \\ -\text{compact} \\ \alpha \text{ round} \end{bmatrix} -$$

Thus \acute{o} , which is round and grave will remain grave; \acute{e} , which is non-round and non-grave will remain non-grave; but \acute{a} , which is non-round but plus grave will become non-grave, i.e., will become \acute{e} .

The underlying shapes (e.g.) *s-baáh-bàdéd 'mountain,' *s-k^wééh-k^wédáb 'chicken,' *toóh-tòq^wod 'pick up,' and *šəəh-šəx^wab 'wind' are thus developed to the stage s-baáh-baded, s-k^wééh-k^wédab, toóh-tòq^wod, but šəəh-šəx^wab. The rule for laryngeal-affection will now give us s-baáh-bàdéd, s-k^wééh-k^wédáb, toóh-tòq^wod, and šəəh-šəx^wab.

It is necessary to modify the vowel-assimilation rule only slightly to assimilate the first segment of the VV sequences to the (stressed) second. As it stands, the rule allows assimilation across a voiceless semi-vowel; we require simply to allow the option of having a null segment between the stressed and unstressed vowels concerned.

The forms used as our examples may now be derived thus: s-baáb-bàdéd, s-k^wééh-k^wédáb, toóh-tòq^wod, šəəh-šəx^wab.

III.3.3. Glottal-insertion and Ordering

The motive for assigning the stress to the second of the two vowels of the Attenuative reduplication was to allow the laryngeal-affection rule to operate within its accustomed domain, viz., with an adjacent stressed vowel. However, the output forms of the corpus to far given show an alternation in stress-position. For instance, although qáíe 'tump-line' gives qá'í-íe, páce 'digging-stick' gives pá'a-pce.

It seems necessary to employ a rule allowing an optional stress-shift from the stressed to the unstressed vowel in the VV sequence. However, we have already formulated a rule allowing just such a stress-shift from the stem to a suffix (Chap. II, sec. 15.6), the only difference being that the rule referred to operated across h or glottal stop.

On the other hand, the output forms of the Attenuative also contain a glottal stop, which we have so far assumed might well be the product of

a much later rule, a rule formalizing the notion that 'the glottal stop heard in these forms is the result of careful re-articulation of what is, fundamentally, a long vowel.'¹

Suppose we insert a glottal stop in the sequences V-V of the Attenuative;² then where must the appropriate insertion rule stand? Clearly, before the rule for optional stress-shift; and if so, then equally clearly before the rule for vowel-assimilation too, for the latter rule would then need no modification. There seems good reason to suppose, however, that glottal stop insertion should follow the vowel-merger rule. If the vowel-merger rule is allowed to operate on the domain V_1V_1 , it has a unique environment; the sequence $V_1^?V_1$, on the other hand, arises from a number of sources, and the vowel-merger rule would require severe environmental constraint.

The order of the rules here referred to may thus, for convenience, be recapitulated:

Vowel-merger ³	- for V_1V_1 sequence
Glottal-stop insertion	- in V V (optional?)
Laryngeal affection	- for stressed vowels
Vowel-assimilation	- across ?/h
Stress-shift (optional)	- across ?/h

For the corpus so far considered, it is clear that the operation of the rule for vowel-loss will give the correct outputs, quite regardless of the optional nature of the stress-shift rule which precedes it.

For example, *s-k^wátad 'rat'; *s-k^wa-áh-k^wátad (sub-corpus [a]). We derive the Attenuative as follows: *s-k^wa-áh-k^wátad, then (the vowel-merger rule operating vacuously) s-k^wa[?]áh-k^wátad (glottal stop insertion).

¹Thus Thompson (personal communication).

²Probably to be made optional. Cf. sǫ́éʔkǫ́le ~ sǫ́éǫ́le 'dog.'

³It is not clear whether a-mutation under secondary stress comes before or after glottal-insertion. Certainly, if we assume that the constituent-structure rule for Attenuative assigns V_1 with its stress, then of course the a-mutation rule must follow the vowel-merger rule; we should otherwise lose the identical vowel sequence. If, on the other hand, the reduplication is assigned zero stress in the first place, then the merger and glottal insertion rules are constrained only to operate before laryngeal-infection.

then (h-affection and vowel-assimilation being inapplicable) s-k^wáʔah-k^watad or s-k^waʔ-áh-k^watad (stress shift option): we see now that the tentative rule we adopted for 'tetra-syllabics'¹ operates on the form s-k^wáʔah-k^watad to give s-k^wáʔah-k^wʔd, where the stressed vowel and the following vowel are retained, but the last two vowels are lost. On the other hand, the 'tri-syllabics' rule operates on the form s-k^waʔáh-k^watad, giving precisely the same output, apart from the position of the stress.

Sub-corpus (b) of Figure 39 demonstrates that vowel-final stems behave just as did vowel-final stems in augment, so far as the vowel-loss rule is concerned. If *paʔáh-pace becomes páʔah-pace (by optional stress-shift), the vowel-loss rule allows retention of the vowel after the stress, deletes the next, but leaves a final vowel intact; this gives páʔah-pce. If the stress-shift option is not taken, the 'tri-syllabics' rule again gives exactly the same result, apart from the position of the stress, which is paʔáh-pce.

For all these cases, we of course assume the later operation of the h-deletion rule. However, this rule is not optional for Attenuative, and it is necessary to mark the special environment (thus, 'oblig in env / - & stem') in that rule.

III.4. Options

Considering now the forms of Figure 40, we must account for the fact that the second vowel of the Attenuative prefix is sometimes lost where we do not expect this to occur, viz., when the stem contains two or more vowels, as in q^wáʔcáde(h); q^wéʔ-q^wáʔcáde(h) 'rabbit.'

Recall that, in connection with ʔ/h-initial stems (Chap. II, sec. 17.2) an option must be allowed for the deletion of an unstressed vowel in the environment - ʔ/h V̌; this gave ləʔélal or l-ʔélal (with later shwa-insertion giving ləʔélal for the latter). We now suggest that the same option obtains in the (converse) environment, viz., V̌ ʔ/h -; this allows for ləʔé-ləxšəd and ləʔ-ləxšəd (again, with ləʔé-ləxšəd later).²

Since the etyma for the forms of the present corpus are as yet unclear, it is difficult to offer any alternative explanation to the above;

¹See Chap. II, sec. 11.

²The rule must thus operate after the (counting) vowel loss rule.

<u>Non-Attenuative</u>	<u>Attenuative</u>	<u>Gloss</u>
lɛxšəd	lɛʔ-lɛxšəd	lamp
qəlʔxəd	qɛʔ-qəlʔxəd	fence
lɛqšəd	lɛʔ-lɛqšəd	canoe-mat
qʷɛʔɛde(h)	qʷɛʔ-qʷɛʔɛde(h)	rabbit
s-xʷəlʔəqʷɛ	s-xʷɛʔ-xʷəlʔəqʷɛ	clam-basket ¹
be-pəlʔɛ-čəd	be-pɛʔ-pəlʔɛ-čəd	I turn it over ²
yəlbelʔəqsəd	yɛʔ-yəlbelʔəqsəd	skirt ³
pɛʔtədexp	pɛʔ-ptədexp	iron; wire ³
s-xʷɛʔay	s-xʷɛʔ-xʷɛʔay	sheep ³

Fig. 40.--Attenuative, Options

¹*s-xʷəlʔəqʷɛ-ačɛ(?). In s-xʷɛʔ-xʷəlʔəqʷɛ, we are unable to account for the shwa. Compare 'I turn it over.'

²The vowel-loss rule applies to the stem. (-čd, 1st sing. subject). Stem-final *-ačɛ(h) does not lose its final vowel.

³The survival of vowels in the stems of 'skirt' and 'wire' is problematic. We suggest *yɛləb-yɛləqsəd, *pɛt-d-yəxVp. As with 'skirt' and 'wire,' 'sheep' may well be a complex stem: in that case, -ay must be numbered among the 'non-truncating' suffixes (which include also -ób s. 'plural,' and -ai 'diminutive') see Chap. III, sec. 7.1, on ai. A 'non-truncating suffix' is one which is part of the (derived) stem, and is counted but not deleted by the vowel-loss rule.

another possibility, however, at least for 'lamp' and 'canoe-mat,' might be to assume that the counting domain of the vowel-loss rule is blocked by (underlying) -CC. Then, forms like lɛxšəd will give Attenuative lɛʔ-lɛxšəd, but the vowel-loss rule will treat this as though it were monosyllabic, giving lɛʔ-lɛxšəd.

We now come to Figure 41, the forms in which represent the monosyllabic stems, again excepting those in initial ʔ/h. We shall assume that the constituent structure of these stems in Attenuative is exactly the same as that for the disyllabic stems treated above,

<u>Non-Attenuative</u>	<u>Attenuative</u>	<u>Gloss</u>
s-xác	s-xáʔ-xɔ̌	rib
sél	sɛʔ-səl	cloth, rag
léq	lɛʔ-ləq	dig
q ^w éc	q ^w ɛʔ-q ^w c ~ q ^w ɛʔɛ-q ^w c	dance ¹
tés	tɛʔ-ts	shoot
s-R ^w spi	s-R ^w ɛʔ-R ^w spi	trout
s-xálʔ	s-xɛʔ-xəlʔ	mark
dáx	dɛʔ-dəx	converse, gossip
ɔ̌sáq	ɔ̌ɛʔ-ɔ̌q	drip

Fig. 41.--Attenuative, Monosyllabic

¹If we assume *q^wécVs, then vowel losses are regular for this form. The check-form would be the inchoative with C₂ reduplication.

If we reconstruct (e.g.) the underlying forms for sél 'cloth,' s-xác 'ribs' s-dáx 'conversation,' we have

se-éh-sel, s-xa-áh-xač, s-də-áh-dəx	
se-éh-sel, s-xa-áh-xač, s-də-éh-dəx	by vowel-merger,
seʔéh-sel, s-xaʔáh-xač, s-dəʔéh-dəx	by glottal-insertion
seʔéh-sel, s-xaʔáh-xač, s-dəʔéh-dəx	by laryngeal affection
seʔéh-sel, s-xaʔáh-xač, s-dɛʔéh-dəx	by vowel-harmony,
sɛʔéh-sel, s-xáʔáh-xač, s-dɛʔéh-dəx	by stress-shift option, ¹

with stress-shift option taken

sɛʔh-sl, s-xáʔh-xɔ̌, s-dɛʔh-dx	by vowel-loss
sɛʔ-sl, s-xáʔ-xɔ̌, s-dɛʔ-dx	by h-loss
sɛʔ-səl, s-xáʔ-xɔ̌, sɔ̌dɛʔ-dəx	by shwa-insertion

without stress-shift option taken

seʔéh-sel, s-xaʔáh-xač, s-dɛʔéh-dəx	without stress-shift,
sʔéh-sel, s-xʔáh-xač, s-dʔéh-dəx	by optional vowel-loss (Chap. II, sec. 17.2)

¹A special difficulty with a language which can justly be characterized as 'hardly spoken' is that we are uncertain as to what the notion of 'optional rule' is describing. In the present case, the so-called 'option' is nearly always taken.

sʔé-sel, s-xʔá-xač , s-dʔ-é-dəx by h-loss
səʔé-sel, s-xəʔá-xač , sədəʔé-dəx by shwa-insertion

Similarly, if the stress-shift option is not taken, and the vowel-loss option is not taken, we derive:

səʔé-sel, s-xəʔá-xač, and sədəʔé-dəx.

III.5. Rule Summary 5

- *1. Constituent Structure, Augment and Attenuative.
- *2. Stress assignment, Augment and Attenuative.
3. Loss of initial laryngeal, Augment reduplication.
4. Augment metathesis.
- **5. VV merger
- **6. Glottal epenthesis, for V-V (opt)
7. Vowel→a mutation.
8. Affix truncation.
9. C-h metathesis.
10. Laryngeal affection.
11. h unvoicing of l.
12. Vowel assimilation.
13. Affix stress-shift.
14. General Vowel loss, to h.
15. V₁ loss in /- H V₁, and mirror env. (opt)
16. h ----> $\left\{ \begin{matrix} \emptyset \\ \text{ʔ} \end{matrix} \right\}_2^1$ in / - voiceless stop
R plus stressed syllable and mirror env.
17. Glottal metathesis.
18. Y-metathesis.
19. Syllabification of Semivowels.
20. Secondary stress-shift.
21. Glottal absorption.
22. N-loss.
23. Cluster-simplification.
24. s-assimilation.
25. Geminate simplification.
26. Syllabic offglide for l.
27. Shwa insertion.

28. N ----> ^NB, with exception env's.
 29. ^NB ----> B, with exception env's.
 30. ^BB ----> B.
 31. h ----> Ø oblig in prefix; but other losses unclear for order.

Note: H = a laryngeal

R = a voiced consonant.

N = a nasal

B = b, d.

* shows rules modified (cf. Rule Summary (4), Chap II, sec. 22)

** shows rules added since Summary (4).

III.6. Laryngeal Stems

III.6.1. Laryngeal-Initial

III.6.1.1. General

	<u>Non-Attenuative</u>	<u>Attenuative</u>	<u>Gloss</u>
(a)	ʔáxcəd	ʔaʔáxcəd	bed ¹
	ʔexécəd	ʔeʔéxcəd	scrape ²
	ʔélačəd	ʔeʔélačəd	eat ²
	ʔesəwac	ʔeʔésəʔwac	chew ³
(b)	ʔáxad	ʔéʔxad	clear the throat
	s-ʔobát	s-ʔʊʔ bat	name
	ʔopát	ʔʊʔpát	eat, feed on
	s-ʔélatx ^w	s-ʔéʔlatx ^w	timber, board
(c)	ʔaɪʔ ócadəb	ʔaɪʔʊʔcadəb	eat quickly
	s-ʔécəbəɪq ^w e(h)	s-ʔeʔécəbəɪq ^w e(h)	clothes
	s-ʔóʎlaxəʔəd	s-ʔʊʔʊɪʔxəʔəd	dish ⁴
	ʔeyəʔhčəd	ʔéʔeyəʔočəd	untie ⁵
	ʔeyəʔjčəd		
(d)	ʔaxéc	ʔaʔáxac	go to bed
	ʔólasqəh	ʔʊʔʊʔlasqəh	go outside--child goes to toilet

<u>Non-Attenuative</u>	<u>Attenuative</u>	<u>Gloss</u>
ʔaléš } ʔáleš }	ʔaʔáʔlaš	sister (male speaking) ⁶
ʔéla1	ʔeʔéʔla1	sing

Fig. 42.--Attenuative, Laryngeal-initial

- ¹*ʔaxéc-Vd. The full stem is seen in the verb form be-ʔaxéc-čəd 'I'm going to bed.' The unmarked form for 'bed' thus shows vowel-losses as for tri-syllabics. Compare be-ʔaʔáxác, with vowel-retention as in di-syllabics.
- ²The shwa in forms like be-ʔeʔéxə-čəd shows that we must suppose -d (transitive) in the underlying string. Thus, *ʔexə́d-čəd.
- ³Glottal stop generated in the stem itself, as explicated at Chap. II, sec. 12, then attracted to the stress in be-ʔéʔəsəʔwac-čəd.
- ⁴Parallel with íkáyas; k-ťákeʔəs, we reconstruct (non-attenuative) *s-ʔólaxayad, which the vowel-loss rule reduces to s-ʔólaxəʔəd.
- ⁵Retention of stem-vowel in be-ʔéʔəyaʔo-čəd: there are few cases of this kind, but it is reasonable to suppose that one constraint on vowel-loss is that we never lose both vowels in the environments - ʔ -.
- ⁶The alternation ʔaléš; ʔaʔáʔlaš suggests that the underlying stressing of the unmarked form must be *ʔaléš; the stressing ʔáleš must then arise by the rule for optional stress shift (Chap. II, sec. 21).

For the formation of the Attenuative from stems in initial glottal stop¹ (Fig. 42), we make the same assumption as we did with ʔ/h-initial stem in Augment, viz.: that exactly the same constituent-structure is required as for stems with other initial segments. We take the parallel forms for 'food' and 'eat' (sub-corpus [a]) as a starting point. Thus:

*sélad:	se-éh-sèlad	*ʔélad:	ʔe-éh-ʔélad
	seʔéh-sèlad		ʔeʔéh-ʔélad glottal-insertion

¹The corpus unfortunately contains no example of an Attenuative based on an h-initial stem; from the account already given of h-initial stems in Augment, however, it is reasonable to assume that such stems will again behave similarly to glottal-stop initial stems.

se ^h h-selad	ʔe ^h h-ʔelad	laryngeal affection
se ^h h-selad	ʔe ^h h-ʔelad	vowel-assimilation
sé ^h h-selad	ʔé ^h h-ʔelad	stress-shift (opt)
sé ^h h-sld	ʔé ^h h-ʔld	vowel-loss

Apart from later h-deletion and shwa-insertion, the Attenuative for 'food' is correct; however, the Attenuative for 'eat' contains an unwanted glottal stop (ʔé^hh-ʔld). We do not wish to invoke a further (and an hoc) rule to 'delete glottal stop following h.' Rather, we recall that ʔ/h is deleted when initial in an unstressed reduplication (see Chap. II, sec. 17.2), and now propose to generalize that rule to 'delete ʔ/h when initial in an unstressed morpheme.' There is no reason to move the rule from the place of the original ʔ/h-deletion rule (Chap. II, sec. 22).

Figure 42(a) illustrates the rules so far given, and shows (e.g.) the option on stress-shift in the forms for 'I eat.' Sub-corpus (b) in turn illustrates the optional loss of an unstressed vowel after the vowel-loss rule proper, e.g., ʔé^hh-ʔld 'clear the throat.'

Sub-corpora (c) and (d), on the other hand, offer fresh problems. Compare the forms ʔexé-čad; ʔe^hh-ʔelad 'I scrape' (corpus {a}) and ʔaxéc; ʔa^hh-axac 'go to bed.' Before V-loss, the Attenuatives are ʔe^hh-exad-čd and ʔa^hh-axac. The vowel-loss rule gives ʔe^hh-xd-čd¹ but **ʔa^hh-xc. The same apparently incorrect result of vowel-loss application obtains with all the forms of sub-corpora (c) and (d).

The different treatment of ʔe^hh-exad- and ʔa^hh-axac does not seem to be explicable in terms of any factor in the environment at this stage of the derivation. However, if we hold that the counting domain of the vowel-loss rule is not here violated, that could only be because the shape ʔa^hh-axac is not correct for this stage of the derivation. The retention of the final a vowel would only be justified had the preceding (and morpheme-initial) vowel already been deleted, i.e., if the shape were now ʔa^hh-xac- instead of ʔa^hh-axac.

The solution we propose is that this is the case for all the forms of sub-corpora (c) and (d). There are at least two ways of accounting for this situation. The first is to assume that not only the initial glottal stop but also the (newly) stem-initial vowel is lost in these derivations,

¹-d, 'transitivity' is responsible for the shwa in the output.
-d- is later lost.

a loss that occurs before general vowel-loss. Thus (e.g.): ʔaxéc ; be-
 ʔa-áh-ʔaxéc , be ʔa-áh-axéc , then be ʔa-áh-xéc ; as against ʔexéd ;
 ʔe-éh-ʔexéd-čd , ʔe-éh-exéd-čd , the additional (optional?) rule immediately following the deletion of initial glottal-stop.

An alternative solution would be to suggest that we have here to do with vowel-initial morphemes, despite our earlier argument to the contrary, and that the relevant constituent structure does not here involve a repetition of the morpheme-initial vowel (e.g., that we have be ʔa-áh-xéc instead of be ʔa-áh-ʔaxéc).

This suggestion must, however, be rejected for the following reasons. There is no independent evidence for the existence of vowel-initial stems¹ in Twana; in particular, the morphology of the Augment, where some of the same forms occur, required no such supposition. In exchange for a further optional rule, it supposes complementarity of constituent structure--which we have so far eschewed.

It is important to note one form whose derivation on the second analysis appears to imply a glottal stop initial base; this is ʔáxcəd 'bed.' But despite the shift of stress in the (derived)² non-Attenuative form, 'bed' is clearly related to the stem in be ʔaxéc 'go to bed,' which must be *ʔaxéc . Thus we see that the surface form of 'bed' derives from ʔaxéc- ; whichever analysis we choose, the two diminutive forms are parallel, and do not require alternant bases.

On the whole, the evidence for distinguishing ʔ- initial vs. V-initial in Twana is weak, and the notion seems too powerful for our present grammar to make use of. We thus assume optional deletion of the newly stem-initial vowel.³

¹The case of the 'field-suffixes' will be discussed elsewhere; the relevance of the topic for historical and comparative studies cannot be rehearsed here, but compare Vogt (1940), who finds contrast between ʔ- initial and V-initial stems.

²Although the formatives involved in the commoner derivational processes are clear, stress shifts are not well understood, especially where the derivation is not clearly syntactical. In such cases, the process is perhaps to be associated with the dictionary and not the transformational and phonological components of the grammar. Here, *ʔaxécVd (with -ad[?] derivative Nominal).

³Even in the light of the analysis now proposed, the diminutives for 'dish' and 'untie' (sub-corpus [c]) remain irregular. As has been

The unexpected glottal stops in ʔaʔá'laš 'sister' and ʔeʔé'laɫ 'sing' in turn seem explicable. Again, two solutions are possible. We may assert that the initial vowel has been deleted, but not the initial glottal stop; this complicates the rule for initial-vowel deletion, which would otherwise specify the (unambiguous) environment 'at a morpheme boundary following h' but is not otherwise objectionable. Alternatively, however, a parallel may be appealed to, in the h-mutation already established.¹

This rule was ordered after optional stress shift, since it must operate on the output-stressed shapes, and after vowel-loss, since it picks up the h-products of lost vowels too. But note that in sʔʔʔɫ'xeʔəd, 'dish' there is no additional glottal stop, even though the environment is appropriate. We do not get **sʔʔʔɫ'xeʔəd. Here it may be assumed that the glottal stop has in fact been generated, but that a rule for dissimilation of glottal stops eliminates one when another follows the next consonant; that is, if the glottal attraction option has not been taken.

The order of the relevant rules is thus:

1. V-loss.
2. h-mutation.
3. Glottal-attraction.
4. Glottal stop dissimilation.²

III.6.1.2. Alternative Attenuative Structure

It would perhaps be plausible to assume the constituent structures of Attenuative to be $C_1\bar{V}_1$ hV₁ & stem. From a comparative point of view, certain Snhomish forms appear to lend color to such a view.³

shown, the base for 'dish' is probably *ʔɫaxayad; it is not clear why all the stem vowels are lost in diminutive, for we expect ʔʔʔɫaxy'd, to give ʔʔʔɫaxeʔəd. Similarly, ʔeʔeyʔʔočəd retains a vowel against the rules given.

The source (etyma and syntax) of many once-occurring forms is quite unclear. The existence of internal word boundaries may be one reason for uncanonical vowel-retention in these forms.

¹Chap. II, sec. 15.4.

²Chap. II, sec. 6.2.5.

³In his (M.S.) account of Snhomish chameleon morphology, Hess cites the following forms:

qíq̄x^wu' 'short of stature' : qí-hi-q̄x^wu' 'nice way of saying someone is short'

From the point of view of Twana morphology, crucial forms are ?aʔáʔlaš 'sister' (Attenuative) and ʔʊʔʂʔlasqəh 'go out' (Attenuative) where the original *h* must be morpheme-final (ʔaʔáʔh-laš) at the point of the *h*-mutation rule; it clearly could not be *-hV and then become -Vh by an attraction-rule, for *h* would have to move away from the stress.

The priority of -Vh- may best be defended by demonstrating the unfeasibility of deriving a Twana form such as ʔaʔáʔlaš using -hV-. Thus ʔa-há-ʔalésʔ, then ʔa-há-ʔalāšʔ, then ʔa-ʔá-ʔalašʔ, then ʔaʔá-lašʔ, with no source for the additional glottal stop we require in Twana.

III.6.1.3. The V~a Rule

The above account omits mention of the rule for substituting a for vowels under secondary stress (Chap. II, sec. 4, Disyllabics stressed on V₂). But it must of course be supposed that this rule in fact applies to all the forms of Figure 42, although the vowels concerned are nearly always deleted by the vowel-reduction rule. Two forms, those for 'go to bed' and 'sister' show the operation of the V to a rule, where the relevant vowel is (properly) not so deleted.

III.6.1.4. Summary

In summary, Laryngeal-initial Attenuatives behave in a manner parallel to Laryngeal-initial Augmentatives.

The morpheme-initial laryngeal is lost in an unstressed morpheme; the following vowel is also apparently lost (optionally); the Attenuative *h* will then in certain cases be found abutting a Resonant, with the usual (glottal-stop) product; finally, if a vowel-loss within the adjacent syllable of the stem should in similar fashion produce a glottal stop, a dissimilation of glottal-stops occurs.

ʔúʔəd 'agree emphatically': ʔú-huʔəd 'agree by lending vocal support while another is talking.'

Although Hess has omitted the Attenuative sub-class C, V₁hV₁ altogether from his IJAL paper (1966), it is quite possible that we have to do with the same -Vh- as has been proposed for Twana Attenuative and not with -hV- at all. Note that, as is common in Salish Attenuatives, the prefix CV takes the stress in the Snohomish type. Then, although Snohomish clearly lacks the (Twana) rule of laryngeal affection, a stress-attraction rule would take an underlying *qí-ih-qx^wuʔ and give qí-hí-qx^wuʔ.

III.6.2. Laryngeal-final

III.6.2.1. General

	<u>Non-Attenuative</u>	<u>Attenuative</u>	<u>Gloss</u>
(a)	sɪʔɔb	sɛʔɪʔɔb	dog salmon
	sɪʔɔl	sɛʔɪʔɔl	herring
	beq ^w ʔɔd	beq ^w ɛʔ q ^w ɔd	drink
	pox ^w ɔb	pɛʔpox ^w ɔb } ~ pɛʔpox ^w ɔb }	blow
	səʔáɔb	sɛʔsaʔáɔb } ~ seʔsaʔáɔb }	work "
(b)	táɪqəb	tɛʔtəɪqəb	shout
	spɔpən	spɛʔpon } ~ speʔpón }	spoon "
	kápo	kékpɔ	coat
	stebʔát	stetɛʔbat	man
	besəʔɔcadəb } ~ besəʔɔcadəb }	besesɪʔɔcadəb } ~ besesɪʔɔcadəb }	cook "
(c)	k ^w ɛʔɔ } ~ k ^w ɛʔɔh }	k ^w ɛʔk ^w ɔ } ~ k ^w ɛʔk ^w ɔ }	pig "
	bɔʔq	bɔʔq ^w ɔbɛ	duck
(d)	bex ^w ák ^w k ^w	bex ^w ɛʔx ^w ák ^w k ^w } ~ bex ^w ɛʔx ^w ák ^w k ^w }	breathe ¹ "
	bewáʔweʔact	bewéwəwəʔact	tell news ²
	ɔóc	ɔɛʔɔoc } ~ ɔɛʔɔoc }	rain ³ "
	bádəh	bɛʔbadaʔ } ~ bɛʔbadaʔh }	child ⁴ "
	sx ^w əyɔy	sx ^w ɛʔx ^w əyɔy } ~ sx ^w ɛʔx ^w əyɔy }	sheep ⁵ "
*		k ^w ɛʔk ^w ɛl } ~ k ^w ɛʔk ^w ɛl } ~ k ^w ɛʔk ^w ɛl }	skate ⁶ " "

Fig. 43.--Attenuative, Laryngeal-final

¹For 'breathe,' no related forms occur in the corpus (sub-corpus d). The geminate k^w final seems to be a (unique!)

Fig. 43.--cont.

reduplication, although this hardly bears on the present question. If there is reduplication, then a CVC-plus-k^w stem may be supposed; and we are of course at liberty to assume a shape *x^wáh-k^w, or *x^wǎh-k^w.

²'Tell news' is suspected of being a reduplicating form in itself; no related forms occur, but a tentative reconstruction might well give *wVyVcVt - and no laryngeal is to be supposed.

³No Augmentative for 'rain' occurs, but clearly the stem must either look like **cǒhVc or simply *cǒc. The possibility of **cǒhc is excluded by the lack of lowering in the forms (we would expect **cǒc), while a stem **cǒhVc would normally not lose its second vowel at all.

⁴The Augmentative bǎdbǎdǎh clearly betrays a stem bǎdǎh (we suppose *bǎdǎh, for reasons already rehearsed). The e in the Attenuative is therefore not explicable on a 'laryngeal stem' theory. We note, further, that there is a semantic shift in this Attenuative; the gloss is 'doll.'

⁵'Sheep' is an especially interesting case; it is the only occurrence of a doublet in the Attenuative. There are three problems in connection with this form. First, it is not clear whether the stem is *x^wǎy^{ay} or *x^wǎy^{ay}; the Attenuative in ǎy could of course come from either. Second, the retention of the final vowel in the stem suggests that -ay is a non-truncating suffix, although its phonetic homonymy with the suffix -ay(h) 'plant' must be coincidental. Third, whichever shape of stem we choose, we certainly cannot call this a 'laryngeal' stem, and hence account automatically for the alternant Ce Attenuative.

Cf. s^wǎǎǎd, 'deer,' however (see Note 94 and fn. in Commentary [Appendix I, sec. 5] to Tale). If the surmise there is correct, and if 'sheep' is indeed related to 'deer,' then s-x^wǎy^{ay} offers a true 'laryngeal-final' stem after all.

⁶No non-Attenuative corresponding to 'skate' has been elicited. A putative *k^wǎVl is the shape we seek.

Figure 43 presents forms for which the corresponding Attenuatives always have the prefix Cé(?). Note also that these forms apparently violate (at least) the rules for laryngeal affection and vowel-loss. The laryngeal-affection rule is violated in the prefixes, where we expect lowering of e under stress before a glottal-stop; and also in most of the stems, where, on the contrary, we do not expect lowering without stress. The vowel-loss

rule is violated in that both the vowels of disyllabics should be lost when the (monosyllabic) prefix is stressed.

Assuming, on the other hand, that the underlying structure is in fact identical with that previously established for Attenuative, brings in its train even further difficulties. Take first the simple case of *ta-áh-táhiqab 'holler' as an example (sub-corpus [b]). Then by stress-assignment, ta-áh-táhiqab; by merger, the same; by ?-insertion, taʔáh-táhiqab; by optional stress-shift táʔah-táhiqab; here the vowel-loss rule is violated. Although the optional vowel-loss would then allow táʔ-táhiqab,¹ it is clear that this form must be marked for at least two irregularities; [minus vowel-loss], and [e-Attenuative prefix].

Take now the form bʔʔq 'duck,' underlying *bóʔq (sub-corpus [c]). The same rules would give bo-óh-bóʔq, bo-óh-bòʔq,² boʔóh-bòʔq; here, the rule for laryngeal affection must be suspended for the prefix, yet operate without stress for the stem; the best result with the present rules would be **bʔʔ-bʔʔq, instead of bʔ-bʔʔq.

III.6.2.2. Re-appraisal of Stress-assignment

Since neither of the proposed solutions provides satisfactory outputs, we must re-appraise the fundamental question of stress-assignment. It has been assumed that the Attenuative prefix contains a stressed morpheme as a matter of constituent structure, and that the stress-assignment rule reads 'in the Attenuative, stress a stressed prefix.' Let us, instead, assume that the prefix (of whatever shape) is unstressed, but that the stress-assignment rule reads 'in the Attenuative, stress the prefix.' Is there, then, any distinguishing mark on these morphemes by which the stress-assignment rule may automatically give the stress to the stem instead?

Note that, in the Attenuative prefix CV-Vh-, the stress is necessarily assigned to the second vowel, i.e., the vowel immediately before the laryngeal (h). We now observe that the stems of most of the 'Ce-'

¹For this type, the dictionary must indicate that the second vowel-loss rule is obligatory and not optional.

²I omit the further complication that the rule for vowel-mutation under secondary stress would also be suspended here or constrained in some ad hoc way, e.g., by the environment.

attenuatives of Figure 43 are of the shape C-V-Laryngeal. For these forms, at least, a plausible stress-assignment rule is thus: 'in the Attenuative, stress the (first) vowel of a laryngeal stem; or (for non-laryngeal stems), the vowel preceding prefix-h.' More formally,

$$[\begin{smallmatrix} +\text{voc} \\ -\text{cons} \end{smallmatrix}] \rightarrow [+stress] \quad \text{in} / \left\{ \begin{array}{l} \& C - H_{(\text{stem})} \\ -h \& C \end{array} \right\}^1$$

III.6.2.3. Analogical Stress-Shift

If, as suggested, stress is assigned to the stem for these forms, then it must be the case that the output stress stands on the prefix as the result of a later, stress-switching rule. Such a rule is probably the result of the force of analogy,² another example of which was illustrated above (Chap. II, sec. 21.4). In the present case, the analogical stress-shift rule must operate after the rule for vowel-loss, and the lack of vowel-loss or even mutation under secondary stress in the stem is thus satisfactorily accounted for. Note that this makes the present rule quite distinct from the affix-shift rule, which operates before vowel-loss. Further, several forms, such as 'man' and 'coat' do not show the operation of this rule, while others ('spoon,' 'work') show that it is optional.

For the moment, we shall build the present conditions into the earlier secondary stress shift rule, which so far covers only the shift back to 'singular' stress in the Augment, and suitably follows vowel-loss.³

III.6.2.4. Re-appraisal of VV Merger

To support, indeed to validate the proposal to treat 'laryngeal' stems as calling for the same spelling for the Attenuative prefix as other stems, we must account for two further anomalies; these are the e vowel in the prefix, and the obligatory loss of the second vowel of the prefix. The stress-assignment rule distinguishes 'final-laryngeal' stems from others

¹The above formulation again stresses the affinity of ?/h for the stress, parallelling ?/h attraction by the stress.

²The analogy is, of course, with the non-laryngeal Attenuatives, with stressed prefix.

³Rule 20, Chap. III, sec. 5, Rule Summary 5.

by giving the stress to the stem for the former but to the prefix for the latter; thus, CV-Vh plus stressed stem, as opposed to CV-Vh plus stem. Two questions arise, then: Is there a suspension of the merger rule for 'final-laryngeal' stems? If not, what role does the stress difference play in ensuring the distinction in the outputs of the merger rule?

The merger rule¹ assimilated the gravity of the second (stressed) mora of a two-mora vowel to the roundness of the first; this gave a, e, o as before, but dissimilated ə to e. But this rule seems ad hoc, on two grounds. First, the use of Roundness as one of the dependant variables was unmotivated; and second, the qualitative dependance of a stressed vowel on the preceding unstressed one appears counter to the run of the language--where, for instance, vowel-assimilation is certainly controlled by the stressed vowel. Besides this ad hoc manner of operation, the merger rule is of course quite unable to account for the vocalism e in the present case.

We now propose that the mergers, in both stressed and unstressed cases, are to be accounted for as effects of h on preceding geminate vowels. The difference is due to the fact that whereas of the stressed vowels only shwa is susceptible (as the weakest vowel²), all the unstressed vowels are affected. The effect is simply one of dissimilation of vocalic gravity in the presence of a laryngeal (h). Thus, particular qualities in the preceding vowel, such as roundness, prove to be irrelevant; on the other hand, the environmental feature previously considered unnecessary in the specification (viz., the presence of h) is seen to constitute the proper motive for the rule.

III.6.2.5. Loss of Prefix Vowel

We turn next to the loss of the second vowel of the prefix. For the 'normal' Attenuative, the loss of the second prefix vowel proved to be optional;³ however, since the counting domain of the vowel-loss rule requires

¹See Chap. III, sec. 3.2.

²Of all the vowels, stressed or unstressed, shwa co-articulates most completely with abutting consonants; shwa is always very much shorter than the other vowels, even under primary stress, etc. (see Chap. IV, sec. 4.4 for discussion and an explanation).

³Chap. III, sec. 4.

both prefix vowels to be present, we concluded that the prefix-vowel-loss rule must follow the vowel-loss rule. With 'laryngeal' stems, however, the loss is obligatory: we may legitimately ask whether this is not perhaps a separate rule.

First, why is this vowel not simply lost by the Vowel-loss rule? To answer this question, we ask another; assuming it is thus lost,¹ then why is the first prefix-vowel not lost at the same time, since this vowel is even more vulnerable, as standing further from the stress? We thus suggest that the vowel concerned is in fact lost prior to the (counting) vowel-loss rule; again, we must consider the agent to be the laryngeal, whose effect is here exercised in a preceding completely stressless environment.²

Since we have assumed that the first prefix vowel becomes e by vowel assimilation (just as the corresponding first vowel for non-laryngeal stems), the loss of the second prefix vowel must follow vowel-assimilation. On the other hand, since in a stressless prefix no stress-retraction can occur, the two rules are in complementary distribution; thus the present rule cannot be ordered viz-a-viz the stress-shift rule.

The order of the relevant rules is thus:

1. Vowel-assimilation (oblig.).
- 2/3. Vowel-loss by h (unstressed prefix) (oblig.): Stress-shift-option.
4. Vowel-loss (counting) rule (oblig.).

III. 6.2.6. Rules Illustrated by the Corpus

We now comment on individual forms of the corpus (Figure 43) especially pointing out the sources, in rule options, of the variants recorded.

Sub-corpus (a) illustrates the operation of the rules for stress-assignment, merger, ?-insertion, laryngeal-affection (in the stem), vowel-assimilation, V-loss by h, analogical stress-shift, and h-loss. We assume the following underlying stem shapes, ignoring nominal s- and aspectual be-. *lɔʔVb 'dog salmon,' *tɔʔl 'herring,' *qʷóʔ 'water,' *póhʷ 'blow,' *səʔ-áʔe(h) 'work.'

¹For vowels before the stress, the only regular rule found is that for shwa.

²Cf. glottal stop dissimilation (p. 153). If we allow Vh → hh, glottal dissimilation (now 'laryngeal dissimilation') will simplify this (Chap. III, sec. 8, Summary of Rules).

Sub-corpus (b) contains forms illustrating a problem with h. It is fairly clear from discussion above (Chap. III, sec. 3.3) that h-loss is optional in a stem, but obligatory in a prefix. The forms for 'shout' are thus simply accounted for. 'Spoon' and 'pig,' sub-corpus (c), on the other hand, are problematic. These are obvious loans, probably through Chinook Jargon, from English and French¹ respectively. If we assume (as I show elsewhere), that the vocalism has been heard as a 'long' vowel and thus re-interpreted as *spóhn (i.e., a 'laryngeal stem'), then the derived Attenuative is reasonable.

A second case of the re-interpretation of a loan word is that of kápo 'coat.' Here, however, no problem with the final vocalism arises, since no laryngeal effect occurs. On the other hand, in accord with the morpheme structure condition that no Twana stem ends in a vowel, we might re-write the stem as *káhpw, or (since the sequence -pw perhaps nowhere else occurs stem-finally) perhaps *káhpoh.²

'Man,' in turn, shows the option on the analogical stress-shift rule; while 'cook' shows the optional loss of the unstressed vowel in a series such as V¹V.

Sub-corpus (d) lists those Ce-Attenuative forms for which it is prima facie unlikely that we have to do with a laryngeal as C₂ in the stem. It was held above that the e-vocalism arose as a result of the merger of geminate unstressed vowels before h. To explain the present forms, it must thus be supposed that they present the following irregularity: the dictionary entry for each is marked [not Attenuative stress-shift]. On the other hand, the 'secondary stress-shift' (optional) still applies.

III.6.2.7. Contradictions in Apparently Laryngeal-Final Stems

It is crucial to the whole of the above argument on stems with laryngeal as C₂ that such stems occurring in Twana should always make their Attenuative with (output) Cé(?). Two forms in the corpus seem at first sight to contradict this implication; they are spáhq^wáí; spé^éépq^wáí 'waterfall,' and x^wó²bat; x^wǒ²bat 'oar.'

¹Chinook Jargon 'cosho.'

²The Augment is, however, kp-káph, which cannot have arisen from *káh-. As with 'one,' we assume dictionary allomorphy.

However, it is simple to show that these stems are not in fact 'final-laryngeal' stems at all. The relation of the non-Attenuative and Attenuative vocalisms in 'waterfall' show us that laryngeal affection has occurred; we require an e/shwa vocalism to produce ɛɛ in Attenuative. The h, present in the non-Attenuative form, has clearly been metathesized¹ to its present position, before the operation of laryngeal affection (as has been shown, the stem is *sp^hq^whəɬ).

In the case of 'oar,' the augmented xbxóʔbat shows that the glottal stop reaches its output position in the non-Attenuative form by rule, this time by glottal-attraction.

III. 6.2.8. Non-Vh Attenuative

<u>Non-Attenuative</u>	<u>Attenuative</u>	<u>Gloss</u>
bəqsəd	bəbəsqsəd	nose ¹
sáp=ɬɬl	səsɬpəlʔəlʔ	flour--little loaf ²
q ^w sóʔóčəd	q ^w sóq ^w sóʔóčəd	string things (fish) ³
sqaból	sqəsʔqəbəl	dug-out ⁴
*	ləʔləʔas	rice ⁵

Fig. 44.--Attenuative Non- Vh

¹'Nose' is here triply irregular; the prefix contains a single, non-lowered vowel (as all these forms do), the stress has not retracted to the prefix, and the final vocalism is shwa and not a by alternation.

²'Flour.' Chinook Jargon has shapes like sapolil, capelil. The vowel-losses are normal for Twana, by rules given, for the unmarked form. The Attenuative, with semantic shift, suggests a relic shape of the type of the diminutive in Coeur d'Alene (Chap. III, sec. 1.2, fn. to Fig. 38[a]). Even assuming a CV prefix, we should also have to assume an h in the stem (i.e., *səhpVlVl) to account for the a-vocalism in the non-Attenuative form. If we assumed the Chinook vocalisms to be the correct underlying ones, we should also have to remark that the Attenuative form fails to undergo the (Twana form of the) vowel-loss rule--we expect *səsapəlʔəlʔ.

³'String things.' Here the additional irregularity is that the stem vowels have been lowered, but remain unstressed. This links the form

¹Ch-metathesis must be involved, and noth-attraction by stress, for the laryngeal-affection rule precedes glottal-attraction (see Chap. II, sec. 15.7).

Fig. 44.--cont

with forms of the shape $C\acute{e}?$ -stem. The \acute{a} in the prefix remains unsolved, despite the discussion there.

- 4 'Dug-out.' The lack of vowel-loss in the stem of the Attenuative is again linked to the $Ce?$ Attenuatives.
- 5 'Rice.' Chinook Jargon, like most Salish, has merged l and r in l . Twana commonly transforms loans into Attenuative shape. Here a shape such as $*l\acute{a}yVs$ must be supposed, if we assume $C\acute{a}?$ - to be the proper structure. Then $l\acute{a}?$ - $layVs$ gives $l\acute{a}?$ $le^?as$ by rules already established. For the additional vocalism in the putative stem $*l\acute{a}yVs$, the form is in all likelihood modelled on Twana forms in $-ayas$, whose semantics ('round object') exactly match the gloss.

However, two further forms present a serious problem. These are $sado^?q^w\acute{a}?$; $sad\acute{e}^?do^?q^w\acute{a}?$ 'main river, little main river' and $spe^?q^w\acute{a}?$ $\acute{a}c$; $sp\acute{e}^?pe^?q^w\acute{a}?$ $\acute{a}c$ 'potato; little potato.'

The underlying form for 'main river,' as has been shown, is $*s-d\acute{a}wa-q^w\acute{a}?$. Stress is assigned to this, giving $s-d\acute{a}wa-q^w\acute{a}?$ which by laryngeal infection and vowel-loss gives $s-dw^?-q^w\acute{a}?$, thence $s\acute{a}-do^?q^w\acute{a}?$ by the rules regularly. We justify the $\acute{e}^?$ sequence (and thus the $\acute{e}^?$) in the prefix of 'little main river' by assuming that, as has been shown, the attenuative does not use the surface but the underlying form of the unmarked stem as its basis. But if this is so, we cannot justify the lowered vowel of the final syllable, since for the 'regular' attenuative the stress is assigned to the prefix.

With 'potato,' the matter is less complex but leaves us with a similar problem. $spe^?q^w\acute{a}?$ $\acute{a}c$ certainly seems like a 'laryngeal-final' stem; we must assume that the stem is in fact $*s-p\acute{a}yq^w\acute{a}?$ $\acute{a}c$. This guarantees the $\acute{e}^?$ in the attenuative prefix, and not the Ce of the 'laryngeal-final' stems; but again, although $-p\acute{a}y-$ gives $-p\acute{a}?$ regularly, we cannot explain the lowered vowels ($-q^w\acute{a}?$) in the stem for the Attenuative, since the stress is assigned to the prefix $s-p\acute{e}^?$, from $*s-p\acute{a}-\acute{s}h$ -stem.

Figure 44 contains forms whose stems cannot be said to contain a laryngeal, and whose Attenuative reduplication contains simply C_1V_1 . Note that these forms all contain shwa as initial stem vowel. Like the non-laryngeal Ce -Attenuatives, these forms must be supposed marked in the dictionary. In the present case, however, the morpheme-feature involved must be [not Vh Attenuative]. Thus a typical Attenuative shape will be: $b\acute{a}qs\acute{a}d$; $b\acute{a}-b\acute{a}qs\acute{a}d$, with stem stress.

It is clear from the form for 'string things' that, as for the Ce-Attenuative, Attenuative stress-shift does not operate, but that stress is (optionally) shifted by the secondary stress-shift rule. In the present case, however, it is not clear that the feature [not Attenuative stress-shift] is required in the dictionary: if, as we have suggested, it is the laryngeal that attracts the stress to the reduplication, then its absence in these cases is sufficient reason for the shift not to occur.

III.6.2.9. Summary

Laryngeal-final stems are thus seen to possess the following idiosyncracies:

1. The laryngeal attracts the stress to the stem-initial syllable.
2. The characteristic e-vowel in the prefix results from the (re-evaluated) merger rule, here on unstressed vowels abutting h.
3. After vowel-assimilation, the second (unstressed) vowel of the prefix is obligatorily lost, by h-influence.
4. The second (or, analogical) stress shift rule optionally takes the stress to the prefix.

III.7. Infix-Attenuative

III.7.1. 'aɬ' and Obligatory Infix

III.7.1.1. General

	<u>Non-Attenuative</u>	<u>Attenuative</u>	<u>Gloss</u>
(a)	sk ^w ʔx ^w ec	sk ^w éʔx ^w caɬ	silver salmon
	ʔaʔócap	ʔaʔóʔcapaɬ	ant ^l
	k ^w opéc	k ^w opéʔcaɬ	master
	steqéw	steqéʔwaɬ	horse
	hədəq ^w	hədəʔq ^w aɬ	hump-backed salmon
	dəʔéb	dəʔéʔbaɬ	Datleb (place name)
	wədəw	wədəʔwaɬ	horn
	qəbəd	qəbəʔdaɬ	axe
	wəhəw ~ wəhaw	wəhéʔwaɬ ~ wəhəʔwaɬ	owl

<u>Non-Attenuative</u>	<u>Attenuative</u>	<u>Gloss</u>
xələw'xələw	xələ'wat	butterfly ²
šə'əb	šə'ə'bat	crab ³
kəkəm	kəkə'mat	small ⁴
spəx ^w	spə'x ^w at	gull
x ^w əx ^w	x ^w ə'x ^w at	fat
(b) x ^w əl' (?)	x ^w əx ^w ə'əlat	small ⁵
ʔasqəc	ʔasqə'ə'cat	short
páʔaq ^w	páʔq ^w at	pipe
ʔe'əqs	ʔe'ə'əqsat } ~ʔəye'əqsat }	good-point (place name) ⁶
yax ^w ələh ~ yax ^w ələh	yax ^w ə'əlat	hawk
ʔayał	ʔe'ə'əyat	pretty child
əlɪz	ʔe'ə'əlsat	Eels (personal name) ⁷
ləl.əwap } ləl.əwap }	ləl.ə'ə'əwpāt ~ ləl.ə'ə'əwpāt } ləl.ə'ə'əwpāt } ləl.ə'ə'əwpāt }	Lilliwap (place name) ⁸
(c) ʔay'əlat		trawling canoe
qəbat		wool-dog
sdx ^w q ^w ə'cat		squirrel
lək ^w at		moon
sčə'wəł		black bear
ʔe'əlat		baby ⁹
čsépat		hat

Fig. 45.--Attenuative, with Suffix -at

¹'Ant.' Cp. ʔasxəc 'tied' (-ap 'end, bottom'), thus probably a reduplicating form. Cp. also ʔáčaptəd 'belt,' almost certainly related, although I do not understand the ó ~ á alternation.

²'Butterfly.' One of a small number of non-monosyllabic forms showing complete reduplication (see Appendix II, The Shapes of Twana Morphemes).

³'Crab.' As explicated in Chap. II, sec. 12, *šəyəb.

⁴'Small.' Apparently a reduplicating form of *kəm. The reduplicating vowel may well be a through the rule for secondary stress (cp. 'ant'); but then why is the reduplicating vowel in

Fig. 45.--cont.

'small cove' not also a? Since this type of reduplication is not productive in Twana, it is probably best to consider such shapes as dictionary entries in their present forms. Common Puget Sound *meməʔəd* is not found in Twana.

5 'Small.' *xʷéɬ*? 'lost' may well be unrelated to the Attenuative here. This Diminutive is described by Mrs. Pulsifer as 'a Quilcene word.' (Quilcene is a very (?) closely related dialect of Twana.)

6 'Good point.' Elmdorf's form shows the option (taken) on the glottal insertion rule $[-ʔeyé.ə \text{ qsaɬ}]$, with off-glide *ə* before velar.

7 'Eels.' The name of a missionary, well loved and hated. The diminutive (he was a small man!) is quite regular, so far as the rules are concerned.

8 'Cove.' Cp. *ləwʔ* 'go in.' If related, then 'cove' is another reduplicating form, like 'ant.'

9 'Baby.' The plural *čəʔčáyʔləɬ* indicates that the underlying form must be **čayal-əɬ*.

Figure 45(a) and (b) illustrates the diminutive derivation in *-əɬ*.¹ This morpheme, the cognates of which are confined in (e.g.) *Coeur d'Alene*² and Upper Chehalis³ usage to 'animate offspring,' is employed in Twana for

1. Animate offspring - e.g., 'master,' 'horse,' 'silver salmon';
2. Animate/human affective diminutive - e.g., 'shorty, fatty,' 'little Eels';
3. Inanimate/diminutive - e.g., 'pipe,' 'axe';
4. Inanimate place-name diminutive - e.g., 'Little *Dəxʷəb*.'

A simple description of the morphophonology of what we shall call Nominal *-əɬ* Attenuative might be: '*-əɬ* induces length in the stressed

¹In complementary distribution with *-əɬ* is *-eɬ*. While *-əɬ* is found only in a Noun Phrase, as above, *-eɬ* is found only as the pronominalized object (field suffix) of a Verb Phrase, e.g., *botób-eɬ* 'suckle,' from *bot* 'suck'; *ʔaskʷəd-eɬ* 'hold a child,' from *kʷəd* 'hold.'

²Reichard par. 502. *-ilt* (*-ält*, *älʔt*). It is not clear how relevant these forms are to the problem of the alternation $1 \sim 1$ (Chap. II, sec. 15.9).

³Kinkade (1963) par. 2.3.5.1., morpheme 4238, *eɬ*.

vowel of the morpheme to which it is suffixed.¹ But such a description is open to the same objections to the cover-term 'length' as were discussed above (Chap. III, sec. 3.1) and it is reasonable to propose the same solution as was adopted for 'Attenuative.'

Nominal -aɬ Attenuative, by whatever syntacto-semantic features it is to be specified in a Deep Structure, is thus to be spelled as 'insert -Vh following the stressed vowel, and add suffix -aɬ,' where V is a copy of the stressed vowel. 'Pretty child' thus requires no special explanation.²

The formulation adopted in fact asserts the identity of the present -Vh with the Attenuative morpheme already established; however, since we have already developed rules not only for laryngeal-affection but also for h-metathesis, it is reasonable to consider whether the correct constituent structure here might not be as follows: stem-h-aɬ, that is -h- and not -Vh. The following assumptions would now have to be made: (1) that h can be attracted to the stress across as many as (any) two segments, e.g., sk^w V̄ x^w c-h-aɬ giving sk^w V̄ -h-x^w c-aɬ; (2) most crucial, that h can become a vowel--with the present rules, this can only mean that we have to do with another laryngeal here (h²) and not the present h!

For the moment, we see no supporting evidence elsewhere in the morphophonemics for the existence of a third laryngeal in Twana, and retain our original interpretation. We thus accept that, instead of partaking of a reduplicating prefix, the present attenuative morpheme -Vh is an infix, the relevant environment for infixation being the presence of whatever semantic features are proper to the suffix -aɬ.

The forms of Figure 45(a) illustrate and confirm the rules already developed for Augment and Attenuative. We give a few typical examples only, before passing to some problematic forms.

'Silver salmon' and 'ant' of corpus (a) show the option on affix stress shift not taken.

The rest of the forms of sub-corpus (a) exhibit the option of stress shift, giving, e.g.,

həde^ʔ q^w-aɬ 'hump-backed salmon,' qəbe^ʔ d-aɬ 'axe,' x^w ɔ^ʔ x^w-aɬ 'fat.'

¹ But 'pretty child' shows -aɬ without infix. The (unanalyzed) forms of sub-corpus (c) show some similar cases; these may well contain an -aɬ not identical with the Attenuative -aɬ.

² It is simply a dictionary entry, ʔəy-aɬ.

The vowel-loss rule, taking the mark [non-truncating]¹ into account for -aɪ, then gives:

hədɛʔq^w-aɪ , qəbɛʔd-aɪ , x^wʔʔx^w-aɪ.

šeʔɛʔ baɪ 'crab,' shows development of glottal stop (ʃʔy-) in the base from a lost shwa (*šəyáb). This glottal stop is then attracted by the stress (šyʔ-), after which the y vocalizes to e (šeʔ-).

III.7.1.2. Problem Forms

Sub-corpus (b) of Figure 45 contains problematic forms, which require comment.

'Small.' If this form is indeed related to x^wélʔ 'lost,' then its morphology is unusual, for it requires prefix-reduplication but infix -Vh- too. The rules would give us the triple glottal stop in x^we-x^wɛʔʔʔl-aɪ. Is this then simplified to x^wex^wɛʔ laɪ by geminate simplification?

'Shorty.' Compare ʔasqáɛ 'short.' No explanation can at present be offered for the double ʔ in the Attenuative.

'Small pipe.' The stem páʔaq^w is the only form in the corpus containing stem VʔV for which an '-aɪ Attenuative' occurs. However, it proves to be quite regular, and incidentally provides a crux case for the ordering of the h-deletion rule. Thus: *pa-áh-ʔaq^w-aɪ by rule 13 has the shape páʔahʔaq^waɪ. Then rules 14 and 15 (vowel loss; V loes in /-H V) gives páʔhʔq^w-aɪ.² Now we require to eliminate the h and simplify the geminate glottal stop; thus the h-deletion rule must precede geminate simplification, giving páʔʔq^waɪ by h-deletion, and finally páʔq^waɪ.

'Good point' (a place-name). The underlying form must be ʔəy-əqs-aɪ; but the unmarked form is ʔeʔəqs, where the pretonic shwa gives a glottal stop which is attracted to the stress, whereupon the y syllabifies (see 'glottal stop in the unaugmented stem,' Chap. II, sec. 12).

'Hawk.' The -h in the unmarked form is not normally present in the output, but supplied by analogy from forms such as (3rd sing. possessive) seʔəh-as 'his house' which retains the non-final h. We have postulated, on the basis of a number of forms of this kind, that no phonological word

¹See Chap. III, sec. 7.1.2-end.

²Final ʔ is not lost here, since -aɪ is 'non-truncating' (ibid.: for rules, see Chap. III, sec. 5, Rule Summary 5.

in Twana ends in a shwa; all forms with (phonetic) final shwa are thus transcribed with final -h.

It is, of course, crucial that the sequence -lh- should not arise before h-unvoicing of l; but the vowel-loss rule which creates -lh- is later. The vowel-loss rule takes the shape $yax^{w\acute{e}'}l\acute{a}h-a\acute{t}$; we thus proceed through $yax^{w\acute{e}'}lh\acute{h}-a\acute{t}$ (vowel-loss), $yax^{w\acute{e}'}l^?h-a\acute{t}$ ($h \rightarrow ?$), $yax^{w\acute{e}'}??lh-a\acute{t}$ (? metathesis), $yax^{w\acute{e}'}lh-a\acute{t}$ (? simplification), and finally $yax^{w\acute{e}'}l\acute{a}a\acute{t}$ (h-loss).

'Pretty little one.' It will be apparent that the source of the additional glottal stop ($?e\acute{e}'ya\acute{t}$) must again be the Attenuative h itself. This glottal stop survives in such a case as the present, where the affix stress-shift option has not been taken, and the second prefix vowel cannot therefore be lost--with the result that no glottal gemination occurs.

Then for the forms 'Lilliwap,' 'Eels' and 'pretty one,' stress shift does not operate, but the vowel-loss rule of course applies. However, the vowel in -a\acute{t}, although 'counted,' is never truncated by this rule, and the morpheme is hence labelled [non-truncating] (compare Chap. III, sec. 4).

'Lilliwap' illustrates the optional loss of an unstressed vowel in / - ? \acute{V}, as well as metathesis of a glottal stop generated by vowel loss with intervening w. Thus:

C.S. Rule	$l\acute{a}l\acute{a}-\acute{a}h-wap-a\acute{t}$	
Stress	$l\acute{a}l\acute{a}-\acute{a}h-wap-a\acute{t}$	
?-epenthesis H-affection, & V-assimilation	$l\acute{a}l\acute{e}'\acute{e}h-wap-a\acute{t}$	
Stress-shift--option <u>not</u> taken		option taken, $l\acute{a}l\acute{e}'\acute{e}h-wap-a\acute{t}$
Vowel-losses		$l\acute{a}l\acute{e}'\acute{e}h-w^?p-a\acute{t}$
→ h → ?	$l\acute{a}l^?e'h-w^?p-a\acute{t}$	$l\acute{a}l\acute{e}'^?h-w^?p-a\acute{t}$
?metath	$l\acute{a}l^?e'h^?wp-a\acute{t}$	$l\acute{a}l\acute{e}'^?h-^?wp-a\acute{t}$
h-loss	$l\acute{a}l^?e'^?wp-a\acute{t}$	$l\acute{a}l\acute{e}'^?-^?wp-a\acute{t}$
Geminate simplification		$l\acute{a}l\acute{e}'^?wpa\acute{t}$

The alternants with l[•] in the stem are to be compared to cases such as $sy\acute{a}l\acute{a}b \sim sy\acute{a}l\acute{a}b$ 'year' discussed in Chap. II, sec. 12.1 (Fig. 17[b]). If the stem is indeed related to $l\acute{a}w^?$ 'go in,' then clearly no geminate l is involved.

III.7.2. Simple Infix

(a)	yáq ^w	ya'e q ^w ab	wash vs. Atten. ¹
	pátšədəb	pə'é tšədəb	set out vs. Atten. ²
	kásčəd	ké'səčəd	urinate: female urinate
	wəłək ^w aqəb	wəłé'ek ^w aqəb	say crazy things vs. Atten. ³
	q ^w əq ^w e'əs	q ^w hq ^w é'əs	narrow (plural vs. sg.) ⁴
	*	sé'x ^w səd	send news
	ʔəsəq ^w səq ^w əso(h)	ʔəsəq ^w sə'ədax ^w	stringing (plural vs. sg.) ⁵
	čəbcəbaq ^w	čəbé'e q ^w	grandmother (plural vs. sg.) ⁶
	yəl'yáleč		
	yəle'áleč ~ séle'áleč	syalé'éč ~ syala'éč	cousin (plural vs. sg.) ⁷
	teč'čəšəl	čč'é'šəl	teen-ager (plural vs. sg.) ⁸
(b)	xéč	xé'č	raw: dyed bark ⁹
	səqəšəle(h)	səq'é'əšəle(h)	elk: animal, worm ¹⁰
	sqalé'	qalé'ə təbčəd	bogey: I was haunted ¹¹
	sq'əlé'	basq'əlé'ə b	backside: greedy ¹²
	be'əbé'	be'əbé'etəb	fruit falls: it's snowing ¹³
	bətə'əd	bəté'əleq ^w bəd	ringing: ring a bell ¹⁴
	q ^w élo	q ^w éla'əy } ~ q ^w éla'əy }	cedar bark: leaf ¹⁵
	k ^w ót	k ^w ə'ət	mat; bedding ¹⁶
	ʔə'əšəbəc	šə'ə'əšəb	please!: merciful to many ¹⁷
	q ^w ə'ə	ləq ^w ə'ə d	water: bailer ¹⁸
(c)	pə'éətəl'əs		wheat ¹⁹
	q'é'əl		perch
	d'é'ət		still, despite
	xə'ə'č		dentalium ²⁰
	pəl'é'ə ləl		lips ²¹
	q ^w asé'əx ^w		porpoise
	č'ə'əs		three ²²
	słə'ə b		dog salmon
	beč'ə'ədax ^w		getting cold ²³

Fig. 46.--Attenuative, with Simple Infix

Fig. 46.--cont.

- 1 'Wash.' $y\acute{o}q^w$ - b (intransitivizing suffix).
- 2 'Set out.' $p\acute{a}t\acute{s}\acute{e}d$ - b. The stem vowel ought to be e/\acute{o} to give $\acute{e}^?e$ in the diminutive. There may thus be an h present, to account for the \underline{a} vowel ($*p\acute{a}h\acute{t}$ [?]).
- 3 $w\acute{e}l\acute{o}q^w$ -V-q- b. Pronominal suffix -q- 'language.'
- 4 'Narrow.' For the plural in Ca , see Chap. II, sec. 21.5. It is so far not clear under what conditions h after an unstressed vowel is retained, while after a stressed vowel it is lost. The stem is either $*q^weh$ or $*q^we?$.
- 5 'Stringing.' Stem probably compound, $*q^w\acute{e}s\acute{o}h$.
- 6 'Grandmother.' Stem must be $*\acute{c}ab\acute{o}q^w$, to account for the lowering of the second syllable vowels; stress retraction in the augmented form is of course normal. An affective Attenuative.
- 7 'Cousin.' Stem $*y\acute{w}l\acute{e}c$. The augmented form is irregular in that the final vowel does not mutate to \underline{a} , according to the rule for vowels under secondary stress. The e vowel in one variant of the augmented form obviously derives from vocalization of the y between consonants, remote from the stress.
- 8 'Teen-ager.' $te-\acute{c}\acute{o}-\acute{c}a\acute{s}Vl$. $t-\acute{c}-$ is a form of the definite article, here probably used to denote the class. The Attenuative \acute{e} implies \underline{a} shwa or \underline{e} in the stem. If this form is at all connected with $\acute{c}\acute{o}\acute{s}$ 'weak,' then \acute{e} is indicated; thus $*\acute{c}\acute{o}\acute{s}-Vl$, with mutation to \underline{a} under secondary stress. The terminal suffix -Vl is to be compared with -al 'offspring.'
- 9 'Raw:dyed bark.' Refers to cedar-bark, dyed a deep red for basket-making.
- 10 'Elk:animal, worm.' Compared with the bear for so much of the Northern hemisphere, the elk was for the Twana the most important ritual animal. See Elmendorf (1960) for 1st-elk ceremony (p. 117). $s\acute{q}\acute{q}\acute{a}l\acute{e}(h)$ seems itself to be a reduplicated stem, possibly related to $s\acute{q}\acute{a}l\acute{e}^?$ 'bogey, monster,' or even to $s\acute{q}\acute{q}$ 'split' (referring to its antlers?).
- 11 'Bogey: I was haunted.' $*q\acute{a}l\acute{e}^?$. The vocalism after the stress is the normal 'copy of the stem-vowel' for transitivity. Vowel-assimilation matches this to the (lowered) stem-final $\acute{e}^?$. - $t\acute{o}b$ may for simplicity be designated as 'subject as patient,' corresponding in many glosses to English passive.
- 12 'Backside: greedy.' A likely metaphorical extension, based on $b\acute{o}s$ 'possessing a -', with verbalizing -Vb suffix. $*q^w\acute{e}l\acute{e}^?$.

Fig. 46.--cont.

13. 'Fruit falls: snowing.' For the morphology, cp., 'I was haunted.' *ʔəbéʔ. Compare the suppletive sʔəqʷəqʷ 'snow,' from s-ʔəqʷ-aqʷ from a root *ʔəqʷ. 'Snow' seems to be an inchoative stem, with LaC2 reduplication.
14. 'Ringing: ring a bell.' The composition of the stem is unclear; the instrumental suffix -bəd is here used alone (cf. the usual frame dxʷ + stem + bəd).
15. 'Cedar bark: leaf.' We must suppose a stem *qʷelóh or *qʷelóʔ, the stress as well as the h / ʔ being necessary to produce the lowered vowel. The suffix is probably identical with -ay(h) 'plant, growing thing,' with vowel assimilation. The stressing of qʷélo is not accounted for: -ay(h) does not elsewhere attract the stress.
16. 'Mat: bedding.' The relation, within the culture, is clear enough. On the other hand, with the simple view of semantic relations here assumed, 'bedding' ought to be related to 'mat' as an Augmented form.
17. 'Please! : merciful to many.' Compare ʔesəʔóšəbəc 'thanks!' The semantic relationship is obvious; cf. modern French. A stem *ʔóš-ab from a root *ʔóš is supposed here. The suffix -c is probably identical with -c 'indirect object.' (The prefix e-s- is the 2nd sing. 'possessive,' used with certain verbs) s- is probably s- Nom. 'Merciful to many' is regular as an Augmented form from ʔóšab.
18. 'Water: bailer.' ləqʷʔəʔd is a compound stem, with prefix l- 'remote,' as in ləʔéʔ 'yonder,' ləc 'that one yonder.' -Vd is a Nominalizing suffix, with vowel assimilation.
19. 'Wheat.' The etymology is unclear. Probably *pét, with -Vlʔəs 'round hard object' pronominal < *elas, eʔlas, or elʔas.
20. 'Dentalium.' Compare xəʔ 'bite' (?). Dentalium was of cultural importance, as one of the media of payment and exchange.
21. 'Lips.' -aləd is the bound pronominal for 'lips.' Compare also (?) pəlʔəd 'tree bark.' The final ʔ in 'lips' is puzzling.
22. 'three.' Perhaps related to tkʷós, 'seven.' ʔ undoubtedly comes from Proto-Salish *k, and *čós thus relates to *kʷós. But Twana is the only (?) Salish language having glottalized ʔ in this form. The analysis *təʔkʷós (see Chap. II, sec. 14) of course militates against the parallel too, since it is probably to be segmented *təʔkʷ - ós (-ós 'face'). Compare Elmendorf (1962) p. 4. Of particular interest from a comparative point of view must be the Sliammon 'three,' čyálas ~ čyáwos (Suttles' field-notes, cited in Elmendorf, *ibid.*), which are most suggestive both for the k - ʔ alternation and the archaic source of Twana 'three.'
23. 'Getting cold.' Two stems for 'cold' occur in Twana, the present *čóʔ, and čéx (as in pəččéx 'winter,' pəd- being a pronominal prefix for 'time').

As was noted above, the co-occurrence of stem-infix -Vh- with -a- (Attenuative) is not obligatory, e.g., in the form for 'pretty one,' ²śya-₁. Conversely, it is clear that some of the occurrences of V?V (where VV are lowered identical vowels) are in fact cases of what we shall call 'Attenuative by stem-infix only.' Since it is not clear how far, if at all, this variant of Attenuative is determined (phonologically or otherwise), we shall for the moment assume that the relevant dictionary entries must be suitably marked.

Figure 46(a) presents forms in which the semantic relation is either unmarked vs. Attenuative, or Augmented vs. unmarked. One example occurs of an affective Attenuative¹ used for feminine, viz., 'urinate.' It is important to note that, since we hold that all lowered vowels are lowered by rule, forms such as that for (unmarked) 'grandmother' must be marked as [oblig. Atten. in sg.] in the dictionary.

Sub-corpus (b) presents forms which seem to be related by the Attenuative structure and rules, but where a semantic shift makes the identification less than certain. Fairly detailed footnotes are given for this corpus, partly in the hope of substantiating the comparisons suggested, but also as a basis for comparative study. Again, to avoid the need to specify lowered vowels in the dictionary, we tentatively mark all these forms as [+Atten] in the dictionary.

Sub-corpus (c) gathers together forms, some of which have been cited before, for which at least two possibilities exist. These may be 'frozen Attenuatives,' the unmarked forms corresponding to which may continue to elude us within Twana, but for which cognates in other Salish languages may be illuminating.² On the other hand, it is quite possible that some of

¹Compare with this the form qə́lśb: qə́'ə qə́ləbčəd 'bad: silly (fem.?) little me,' the latter in an autobiographical tale told by Mrs. Pulsifer concerning her youth.

²An example of the examination of cognates in validating such analyses is the case of Twana yé'yəstəhe 'wild rose.' Gunther (1945) p. 34, gives Snohomish yēstád, from which we see that the Twana form is an Attenuative. For the alternation d ~ h ~ ~~ʃ~~ / - #, see Chap. II, sec. 8.

these forms have (lowered) V?V sequences as a result of some of the possibilities already surveyed (Chap. III, sec. 1.2). For convenience, we summarize these here:

1. Presence of stem-formative V for 'transitivity,' with CV? root, with vowel assimilation.
2. Vowel-assimilation in a vocalic suffix, following CV? stem.
3. Chance collocation, such as be- prefix with ?eC stem.
4. Intensive reduplication, with ?VC stem, with stress-retraction.

For the forms of the corpus, we suggest the following. 'Wheat' and 'porpoise' are probably frozen Attenuatives. 'dog-salmon,' 'three,' and 'getting cold' probably show vowel-assimilation. The rest of these forms may also arise through vowel-assimilation, although it is not clear how we should deal with such forms as dictionary entries. 'Lips' shows an uncanonical ʔʔ; we expect the stem to show e or ə.

III.7.3. Summary

We must thus distinguish two types of Attenuative morpheme: the prefix, and the infix. No conditioning is present, either phonological or semantic, from which we may predict when -a- is to be used; but its use is (almost) always accompanied by infixed -Vh-. On the other hand, some forms must be marked (in the dictionary) as taking only the infix. Finally, some 'frozen' Attenuatives must probably be recognized, while some 'pseudo-Attenuatives' arise through chance collocations whose outcome (by rules) resembles the Attenuative formation.

III.8. Rule Summary 6

- *1 Constituent Structure for Augment, Attenuative.
- *2. Stress assignment for Augment, Attenuative.
- *3. Loss of initial laryngeal, in unstressed morpheme.
- **4. Loss of initial vowel in (Attenuative) stem.
- 5. Augment metathesis, for laryngeal stems.
- *6. VV merger, stressed vs. unstressed.
- *7 Glottal epenthesis (in V-V) (optional)
- 8. V - a mutation, under secondary stress.
- 9. Affix truncation.
- 10. C - h metathesis.
- 11. Laryngeal affection.
- 12. H unvoices l.
- 13. Vowel assimilation.

- Unordered { **14. Unstressed V assimilates to following h¹ (in Atten. prefix).
 15. Affix stress-shift (optional)
 16. Vowel 'loss' → h (counting rule).
 17. V₁ loss in env / - H V₁, and mirror env.
 18. h → ? , in / R.
 19. Glottal metathesis, towards the stress.
 **20. h-loss before a consonant (all cases?)
 **21. Laryngeal dissimilation
 22. Y-metathesis.
 23. Syllabification of semi-vowels.
 24. Second (analogical) stress shift.
 { For Augment, shift to Unaugmented stress pattern.
 { For Attenuative, shift stress to stem.
 25. Glottal absorption.
 26. N-loss.
 27. Cluster simplification.
 28. s- assimilation.
 29. Geminate simplification.
 30. Syllabic offglide for ɹ.
 31. Shwa insertion.
 32. N ---->^NB, with exception env's.
 33. ^NB ---->B, with exception env's.
 34. B ---->B.
 35. Loss of remaining h. (Order?)

Note: H = a laryngeal
 R = a voiced consonant
 N = a nasal
 B = b,d.
 * shows rules modified
 ** shows rules added. Cf. Rule Summary 5 (Chap. III, sec. 5).

¹The argument at Chap. III, sec. 6.2.5. 'Loss of prefix vowel' supports the analysis finally preferred (see Chap. IV, sec. 4.4.2.4). Unstressed vowels to be 'lost' will become [-Tense], and merge with h.

CHAPTER IV

THE PHONETIC OUTPUT

IV.1. Introduction

IV 1.1. General Note

In this chapter, we shall re-consider the Distinctive Features to be used in dictionary entries and rules for the phonology of Twana. We shall tentatively adapt the features to be used, to the distinctions and definitions given by Chomsky-Halle (1968), hereafter referred to as SPE, taking as criteria the requirements (a) plausibility of rule-operation, and (b) phonetic reality in Twana outputs. For simplicity of exposition, we shall take the features in order of the major classes in SPE, relating them to relevant rules.

It is important to note that, as pointed out in SPE, the Chomsky-Halle Distinctive Features are defined in terms not of acoustics or perception, but primarily of articulation. An attempt is made below, however, to add relevant acoustic explication, at least so far as the all-important concept 'neutral tract' is concerned.

Although certain disagreements with SPE will become apparent, no systematic critique of the SPE features is attempted; indeed, certain of the SPE features (e.g., the features Distributed and Covered) are omitted altogether from the discussion below, since I do not see their relevance to a discussion of Twana phonology.

Topics of very general importance discussed in this chapter include:

1. The concept of 'spontaneous voice.'
2. The speech-neutral tongue position.
3. Palatalization.
4. Underlying Nasals, and the Obstruent trend.
5. Degrees of glottal constriction.
6. Tense and Lax, especially the status of shwa.

p	t	c	č	ʃ	k	k ^w	q	q ^w	ʔ
p	t	c	č	-	k	k ^w	q	q	-
-	-	s	š	ɬ	[x] ¹	x ^w	x	x ^w	h
b	d	ʒ	j	-	g	g ^w	-	-	-
m	-	-	y	ɭ	-	w	-	-	-
m	n	-	y	ɭ	-	w	-	-	-
</									

IV.1.2 Consonant contrasts (surface)

t-č	táb	what?	čábaš	he gave it him
	ʔwát	someone	ʔwáč	walk
c-č	céq	stab	čéq	red
	ʔaxéc	go to bed	xéc	raw
c-č	cábšəd	twice	čábaš	he gave it him
	ʔas-qác	short	x ^w ác	wake up
č-č	čéx	sicken	čéx	cold
	ʔóč	wring out	ʔéč	pull herbs
č-č	čéd	string	čét	near
	ʔác	belly	čóč	sharp
k-č	kás	urinate	čós	elder sister
k-k	káwłəb	nourishment	káks(h)	crow
	mélk	milk	saʔ ák-ay	brake-fern
k-q	kás	urinate	qás	scratch
			pəq	white
k-k ^w	kápo(h)	coat	k ^w ábaləx ^w	cedar-root
			čák ^w	pierce
k-k ^w	káks(h)	crow	k ^w áp	correct
	saʔ ák-ay	brake-fern	cacák ^w	lie down
k ^w -k ^w	s-k ^w əx ^w ec	silver salmon	k ^w əx ^w ədəh	rock-clam
	psək ^w	broken	cək ^w	angle-worm
q-č	qál	dislike	qál	believe
	xəq	have pain, hurt	xəč	to land
q-q ^w	qál	dislike	q ^w ál	paint
	pəq	white	pəq ^w	broken end
č-q ^w	qál	believe	q ^w ál	ripe
	yəč	file	yəč ^w	wash
q ^w -q ^w	q ^w əč	drop	q ^w əč	hide
	łəq ^w	lick up	łəč ^w	rest
h-ʔ	hohób	power to kill	ʔohób	wish
	bəłál g ^w ə(h)	navel	ʔəg ^w əʔ	monster
h-s	ʔas-hób	red-painted	ʔas-ób	smelled
	čə(h)	spouse	čós	elder sister
h-x	hál	stop from crying	xáltəd	cradle
	dəčəh ~ dəčəʔ	I, me	dəx	converse
h-x ^w	hóy	then(connective)	x ^w óy	sell

x ^w -x ^w	ʔas-x ^w ʔl	picked	x ^w ʔl	nine
	lax ^w	long	ʔax ^w	old
x-x ^w	x ^ʔ ʔ	bite	x ^w ʔʔ	catch
	čéx	cold	čéx ^w	boil
x-š	xáq	hurts	šáq ^w	smear
	tá lax	use	čá lax	hand
č-š	čáq ^w	go through mud	šáq ^w	smear
	k ^w ʔč	wild	k ^w ʔš	count
š-s	šédaq	fly	sédak ^w	sea
	čəʔwáš	wife	yədəʔwáš	heart
š-l	šéc	pay	léc	scatter
	čes	help	čel	hang
l-x ^ʔ	lax ^w	long	ʔax ^w	old
	xá l	angry	x ^ʔ ʔ	bite
l-l	léq	slip	léq	bury, plant
	x ^w ʔl-	without	x ^w ʔl	gather
m-m ^ʔ	təməq ^w as	motor-car	mə-m ^ʔ əs	thin
	x ^w ésqam	few	-	
n-n ^ʔ	s-nəʔkéyah	diving duck	-	
	skólman	teacher	-	
l-l ^ʔ	láb	rum	l ^ʔ ábdax ^w	look!
	čél	lazy	x ^w él ^ʔ	lose
w ^ʔ -w	wáč	clock	ʔwáčab	walk
w-w ^ʔ	waháw	owl	wadáw ^ʔ	horn
y ^ʔ -y	yás	aim	ʔyáš	carry on back
y-y ^ʔ	hóy	finish	hóy ^ʔ	goodbye!

Fig. 48.--Consonant Contrasts, Surface¹

¹ʔb/b^ʔ, ʔd/d^ʔ are rare initially, though common elsewhere: these are everywhere held to be sequences, and not single segments (see 'Glottal attraction,' Chap. II, sec. 3.3, and passim). Examples of the sequences in contrast with the single segments are:

bále(h)	'fish-egg-	-	b ^ʔ álaldax ^w	'get busy!'
ʔaslób	'healed'	-	słób ^ʔ ~ słó ^ʔ b	'soup'
déc	'graze (wound)'	-	d ^ʔ és	'came'
čéd	'shake'	-	bəščéd ^ʔ	'louse'

IV.1.3. Vowel Contrasts (Surface)

<u>é</u>	<u>á</u>	<u>ó</u>	<u>ə</u>
ḡḡḡ	ḡḡḡ	ḡḡḡ	ḡḡḡ
to milk	sew	float	excrement
tḡḡ ^w ab	tḡḡ ^w	tḡḡ ^w	tḡḡ
play	lick	find	closed
sḡl	ʔasḡleh	sḡlʔ	
cloth	two	go to ...	
wḡḡ ^w	s-ə-wḡḡ ^w sab	dax ^w -wḡḡ ^w ad	wḡḡ
kick	lightning	graveyard	open
ʔḡx	ʔḡxcad	ʔḡx ^w sab	ʔḡxad
scrape	bed	buy a wife	clear throat

<u>é</u>	<u>é</u>
sḡʔsaʔačab	sḡʔsal
work (Atten.)	cloth (Atten.)
q ^w ḡʔq ^w ay	q ^w ḡʔq ^w st
beads	cow (Atten.)
spḡʔpon	spḡʔx ^w at
spoon (Atten.)	gull (Atten.)
k ^w ḡʔk ^w šə(h)	k ^w ḡʔk ^w eʔəčšad
pig (Atten.)	king salmon (Atten.)
ʔasʔəlḡx ^w	həl.ḡčad
hunter	I'm alive

<u>ó</u>	<u>ó</u>
ʔabḡtadax ^w	bḡt
he sat down	only
beʔohḡbčad	ʔasʔhḡbčad
I wish	I'm wishing
x ^w ḡʔbat	sʔʔbat
paddle	nickname (Atten.)
heʔḡdax ^w	heʔḡdax ^w
he was coming along	come on!
hohḡbas	hohḡʔ
red bluff	many

Fig. 49.--Vowel Contrasts, Surface

IV.2. Major Class Features

IV.2.1. Sonorant, with a Caveat

The concept of 'spontaneous voice' links the sub-classes vowel, glide, liquid and nasal.¹ For Twana, the same concept is crucial to an understanding of the contextual variants of glottalization, as shown below (Chap. IV, sec. 3.9). All non-Sonorants are (by definition) Obstruents.

IV.2.2. Consonant

All non-Sonorants are Consonants, as are also the liquids and nasals. The class of vowels and glides (V, w/y, h/?) is left as non-Consonant.

IV.2.3. Syllabic, and the Semi-Vowel Rule

In SPE, vowels and liquids are Syllabic. On the other hand, the class of Twana 'Resonants' (m,n,l,w,y) would be identical with the class of non-Syllabic Sonorants provided we assumed that liquids are non-Syllabic. Note that the only liquids in Twana are laterals.

The feature Syllabic has already been adopted in Chapter II² above. However, it was adopted in addition to, and not instead of Vocalic. With the adoption of Sonorant, as in SPE, Vocalic is now redundant, as is seen from the chart following (Chap. IV, sec. 2.4): those segments which are potential syllable-peaks are Sonorant,³ and of these the vowels are inherently Syllabic.

The Semi-Vowel Rule must thus be modified slightly, and its left-hand side now reads [+Son,-Con,-Syll,+Voice] (Rule 27, Summary 6, Chap. III, Sec. 8).

¹Chomsky-Halle (1968), pp. 300-301; Halle-Stevens (1967). See Chap. IV, sec. 3.7.1.2 for an application. It is important to note that the two pieces of experimental evidence supposedly supporting this concept must be accepted only with reservations. Perkell's (1965) cineradiographic data show that pharynx-width for n is almost as great as that for d, against expectation. In turn, there is disagreement between Halle-Stevens (1967) and Peterson-Lehiste (1960) in the matter of increased vowel-length before d as against n. But these are matters that must be taken up in another place.

²See Chap. II, sec. 18.2.

³h/? never become syllable-peaks in Twana, although they may derive from them. The Feature Sonorant in effect replaces the cover term 'resonant' (of Chap. II), although Sonorant also includes the laryngeals h,?. The development of 'secondary ?' from h is thus to be viewed as a dissimilation of [Continuous], for a voiceless Sonorant abutting the voiced Sonorant.

IV.2.4. Twana Distribution of Major Class Features

	<u>Son</u>	<u>Cons</u>	<u>Syll</u>
Vowels	+	-	+
wy }	+	-	-
h? }			
l }	+	+	-
N }			
Rest	-	+	-

Fig. 50.--Major Class Features (Matrix)

IV.3. Cavity Features

'Cavity' corresponds to 'position of articulation.' (Cf. SPE 7, par. 4.)

IV.3.1. Anterior and the Need for Oral

Anterior includes articulations anterior to those made with the body of the tongue, i.e., labial and dental. Noting that the feature of Gravity has been abandoned in SPE, we see that a rule requiring the unique specification of labials (such as our third rule for cluster-simplification in the Augment) ought now to become more complex. However, provided we retain the feature Labiality discussed in the text (Chap. II, sec. 7.5), the loss of Gravity as a feature affects the first cluster-simplification rule (Chap. II, sec. 7.2) for Augment only formally.

The Conditions on cluster-resolution now read:

{1} is [+voice]
 {1} is [+Cor] , {2} is [-Cor]
 {1} is [-Cor] , {2} is [-Lab].
 {1} is [+Cont]

IV.3.2. Coronal

This feature refers to the raising of the tongue blade from the speech-ready position.¹ It thus distinguishes dental, alveolar, and alveo-palatal articulations, as a class. The rule (Rule 28) for assimilation of s to a

¹Chomsky-Halle (1968), p. 300, refer to the 'neutral position.' This is the characteristic attitude in which the subject positions b'

following ʃ or ç ¹ might be simply written in terms of Anterior and Coronal.² Thus:

$$\begin{bmatrix} +\text{Cor} \\ +\text{Cont} \end{bmatrix} \xrightarrow{3} [-\text{Ant}] \text{ in env. } / - \begin{bmatrix} +\text{Cor} \\ -\text{Ant} \end{bmatrix} .$$

IV.3.3. High, Low, and Back

IV.3.3.1. The Support for 'Mid-Front' as the Speech-Neutral Vowel--a Formal and Substantive Universal

These features refer to both consonants and vowels, since they indicate the position of the body of the tongue relative to that for 'speech-neutral.'

It is important to note that the basis for the choice of the features High, Low and Back⁴ is the claim that the speech-neutral position of the tongue-body is 'about the level that it occupies in the articulation of the English vowel [e] in the word "bed."⁵ SPE later adds⁶ 'in characterizing these features [i.e., High, Low, Back] we shall be concerned with the various displacements of the tongue from the neutral position.'⁷

tract just prior to speaking. While the concept is explored so far as the vowel-features and Coronal are concerned, no further use is made of it in SPE. See also fn. 7 below and Chap. IV, sec. 3.7.1. Nasals.

¹ See Chap. II, sec. 7.6.

² But see 'Coronal and High' (Chap. IV, Sec. 3.4).

³ It is unnecessary to indicate [+cons]: y is (vacuously) included.

⁴ Most particularly, Back, without a corresponding Front. 'Central' vowels are thus to be considered [+Back, -Round], and not [-Front, -Back].

⁵ Chomsky-Halle (1968), p. 300. The example shows that a lax non-high vowel is concerned

⁶ Ibid., p. 304.

⁷ Chomsky-Halle stop short having defined 'speech-neutral' for the tongue, and 'spontaneous voice.' But there is evidence that this priming for speech (1) involves global re-programming in the cooperation of all the members of the vocal tract, (2) comes into play measurably before the commands for individual segments, (3) is perhaps carried out in a sequence showing hierarchical characteristics, and (4) may well prove to be (at least in part) language-particular.

The search for empirical support (or rebuttal) for such a sub-stratum

Any attempt to utilize for Twana the same features as those in SPE must, therefore, be made with the explicit understanding that the speech-neutral position for the tongue body as defined in SPE is not merely a formal universal but also a substantive one. In particular, it is implied that Twana (e.g.) employs the same speech-neutral tongue-body position.

Is there any evidence to suggest that we have here to do with a substantive universal? Put another way, is there any special reason why the tongue-body position should be near [ɛ] and not, for example, near [ə], which is traditionally the neutral vowel?

As has been pointed out by Chiba and Kajiyama,¹ the vowel in which the vocal cavity comes nearest to uniformity in sectional area is lax[ɛ]. For a 17cm length uniform tract, Chiba and Kajiyama calculate that the first three formants should have the frequencies 515, 1540, and 2570 Hz. If we compare these with figures for American English *ɛ*, *æ*, and *ɜ*,² we find the following:

	F1	F2	F3	
<i>ɛ</i>	550	1800	2450	Hz.
<i>æ</i>	625	1525	2500	
<i>ɜ</i>	525	1375	1675	

from which it may be seen that *ɛ* is indeed closest to the 'uniform tract' condition for which the above calculations hold.

Note that the uniform tract configuration is of course the one in which the partial tones will be best distributed, both for range and for intensity, since it shows least over-all constriction and (by definition) no localized constrictions.

Thus, there seems to be an acoustic basis for the notion 'universal neutral vowel,' implicating the most uniform cross-sectional area of the tract, which in turn correspond to a mid-front lax vowel.³ The hypothesis of SPE

to Phonology is of course still in its infancy. The corresponding notion in traditional treatments of phonetics is The Basis of Articulation.

¹Chiba and Kajiyama (1958).

²Lehiste (1964). I cite typical figures (see List 1, Table 2-VIII, p. 25).

³The significance of shwa as so-called 'neutral' vowel must, of course, be sought elsewhere if the above argument proves to be valid.

seems thus to be confirmed as a substantive universal, and we shall (at least tentatively) assume the use of High, Back and Low to be justified for Twana too.

IV.3.3.2. Tongue-Body Features and Twana Vowels

Leaving aside for the moment the problem of shwa (see Tense, Chap. IV, sec. 4.4) the Twana vowels to be accounted for are [e, ɛ, a, ɔ, o] of which *e, *a, *o may be held to be the only vowels required in dictionary representations.¹ Clearly, these latter may be uniquely defined as, respectively, [+High], [-Low], and [+High, +Back]; the precise degree of each feature may then be specified as an integer-value of the feature for Twana, in very 'late' rules.

Consider, however, a rule such as that for laryngeal affection. The influence of h is one of lowering, and h is properly specified as [+Low]: but in that case we should prefer to say (what is in the end phonetically true) that the vowel becomes [+Low] too. Thus e, o are better specified as [-High] in dictionary entries,² while we prefer to continue labelling them e, o.³

The specification of the Twana vowels in terms of 'tongue body' features is thus:

	e	(ɛ) ⁴	a	(ɔ)	o
High	-	-	-	-	-
Low	-	+	+	+	-
Back	-	-	+	+	+

Fig. 51.--Vowel Features (Tongue-body) (Matrix)

¹The so-called 'alternation condition' (Kiparsky [1968]) has, we recall, been circumvented by the analysis of non-alternating cases of [-High] vowels as derivative, even in the absence of the putative base forms (Chap. III, sec. 7.2).

²The 'oddness' of Twana (and other languages in the area) is thus deeper than we otherwise implied--there is non-maximal use of the phonological space (see Chap. IV, sec. 4.4.2.2)

³Cf. the more common (phonemic) usage i, u for 'the high vowels,' adopted in part in the Appendices for the convenience of Salishans.

⁴Segments not occurring in dictionary entries are bracketed.

It is at once seen that a is not distinct from ɔ, both [+Low, +Back]. We assign [-Round] and [+Round] to these segments respectively, and shall justify the distinction below (Chap. IV, sec. 3.6).

IV.3.4. Coronal and High. The Misleadingness of Old Diffuse

Despite the characterization of Twana o as [-High], there are two forms in the corpora in which underlying o has the phonetic shape [ú]. These forms are *nók^wimał [dúk^webał], 'Duk^wibał' (the mythical hero--see the Tale, Appendix I, note 29) and *noxóyay [dusúyay], 'wolf.'

The form 'Duk^wibał' is in all likelihood an unassimilated loan; on the other hand, the stressed o in 'wolf' may well represent a rare double environment [+High] - [-Back] to which the vowel o assimilates.

Assuming the reasonableness of the foregoing, it is in order to re-evaluate the rule (Chap. IV, sec. 3.2) for assimilation of s to following š/č. The s-assimilation rule is thus to be re-written:

$$\begin{bmatrix} +\text{Cons} \\ +\text{Cont} \\ +\text{Cor} \end{bmatrix} \longrightarrow [+High] \text{ in env. / } - \begin{bmatrix} +\text{Cons} \\ +\text{Cor} \\ +High \end{bmatrix}$$

The use of High instead of Diffuse is again vindicated in the re-appraisal of the case of the high front allophone of unstressed shwa after š, č and y. Instead of a dissimilation from Diffuseness, we obviously have here to do with assimilation of High and Back. The relevant rule¹ will be:

$$\begin{bmatrix} +\text{Syll} \\ -\text{Tense} \\ -\text{Stress} \end{bmatrix} \longrightarrow \begin{bmatrix} +High \\ -Back \end{bmatrix} \text{ in env. / } \begin{bmatrix} -\text{Syll} \\ +High \\ -Back \end{bmatrix} -$$

IV.3.5. 'k -č- č' and the 'Alternation Condition'

	Unaugmented	Augmented	Gloss
(a)	šáw? ~ šáw?	šo ^o šáw?	bond
	šáx ^w ab ~ šáx ^w ab	x ^w šáx ^w ab	wind ¹
	čálasš ~ čálasš	čál ^o čálasš	hand ²
	čáp	pčáp ~ pčáp	aunt
(b)	šá ^o wał ~ šá ^o wał		mole ³
	šá ^o was ~ šá ^o was		hill

¹ See Chap. IV, sec. 4.4.2.2. on co-articulation.

Unaugmented	Augmented	Gloss
bəšaq ^w áʔčəd	bəšaq ^w áʔčəd	I'm smearing it
ščátqɪəb	ščátqɪəb	bear
(c) yəššəd	šeʔššəd ~ šeʔššəd	foot
spəččo	spəččo	root-basket ⁴
ʔəsxčád	ʔəsxčád	how ⁵

Fig. 52.--č / č̣ and š / ṣ̌⁶

- ¹'Wind.' The Augmented form shows cluster-simplification.
- ²'Hand.' Cf. čaláš, with the same meaning. One of a number of forms showing free(?) stress alternation (Chap. II, sec. 21), and compare 'mole' below (fn. 3).
- ³'Mole.' Cf. šəʔwáɪ, 'road, door.' One of the very few pairs of lexical items illustrating stress-position contrast. Compare ʔélal, 'sing' with ʔelál, 'weep.' But Elmendorf (1954) glosses 'mountain beaver.' His [šáwʔat] shows lack of glottal attraction for informant HA. Cf., Puget Sound šáwʔɪ.
- ⁴'Root-basket.' I did not elicit a reduplicating plural: it is thus not clear whether the root shape is *səpə- or *pə- with *s Nominal.
- ⁵'How?' Cf. beʔəʔéʔčədəbč 'whatever are you doing?' in the text of the Tale (note 85, Appendix I, sec. 5).
- ⁶The solitary example šédak^w alternating with sédak^w 'Canal, sea,' shows the palatalization alternation may also apply to some *s forms. The etymology of 'sea' is obscure (see Tale, note 60, for comment).

kéʔs	urinate (child) ¹
kás	urinate (female)
kəʔə(h)	mummy
káya(h)	granny
káwɪəb	nourishment ²
kápo	cat-tail coat ³
kás	railway-carriage ⁴
kéʔe	shut-up ⁵

kcáp	dark
dáktə(h)	doctor ⁶
stáhkəd	stocking ⁶
tkáx ^w	spank
tkáyas	bear-grass basket
tkácab	get soaked
má'lk	milk ⁶

Fig. 53.--k - Forms

- ¹'Urine' is clearly an affective Attenuative formation. kás is the non-Male root, suppletive to the (male) *sáx^w.
- ²'Nourishment.' Cf. text of Tale (Appendix I, sec. 5, note 56).
- ³'Cat-tail coat.' French loan, through Chinook (?).
- ⁴'Railway carriage.' English loan, 'car.' Borrowed from plural 'cars.'
- ⁵'Shut up!'. Source unclear, but putatively from a shape like *ké?V(h). If Attenuative in formation, then perhaps from *káh.
- ⁶'Doctor, stocking, milk' Loans from English. 'Stocking' is probably to be rendered *s-tákhən, since the Augmented form is s-k-táhkəd. 'Milk' shows a lax vowel, corresponding to the English lax /ɪ/, and not identical with Twana (Tense) /ε/.

káka(h)	crow ¹
kaké'maɪ	small ²
tákače(h)	white pine ³
tál'ka(h)	fawn ⁴
snənəkéya(h)	horned grebe ⁵
sa'ákay	brake fern ⁶
cá'kcəkəde(h)	humming-bird ⁷

Fig. 54.--k - Forms

- ¹'Crow.' Seemingly pan-Salish. Probably reduplicating. *káh.
- ²'Small.' Cf. kákəkam 'small.' Asserted by informant, Mrs. Pulsifer to be a Quilcene form. Quilcene is at the northern extremity of pre-Reservation Twana territory (see Fig. 1, Chap. I, sec. 2.1). This suggests a root *kəhm. The Skokomish-

Fig. 54.--cont.

proper 'small' clearly shows *aɪ 'Attenuative,' which induces the Attenuative-type vocalism by infixing -Vh (Chap. III, sec. 7). The stem is, of course, to be marked [not k→č, not m→Obstruent]. This accords with the observation that morphemes, not segments, are exceptions to P-rules. But see Kiparsky (1968) for reservations on this score. The stem here is, of course, *kəh+kəhm.

- ³'White pine.' The form seems to contain suffix *aki(h), bound pronominal for 'hand' (Semantics?).
- ⁴'Fawn.' The only suppletive Attenuative in the Corpus for Twana. Cf. Suppletive stems for Augment (Chap. II, sec. 2).
- ⁵'Horned grebe.' Alternatively stressed snənəkəyeh. The form snənəkəyeh shows the underlying vowel é: snənəkəyeh could not otherwise have e (because of vowel-loss), which shows that the latter stressing arises by secondary shift (Chap. II, sec. 21.4) (cf. fn. 7 below).
- ⁶'Brake fern.' Clearly, *saʔák-ay(h), with 'plant' suffix (see Chap. II, sec. 12.3).
- ⁷'Humming-bird.' Clearly reduplicating, from *cək-ane(h) (bound pronominal, 'ear'(?)). The surviving shwa in the stem suggests that the stress falls on the reduplicating syllable as a result of the secondary stress shift rule, and not by CS rule (cf. fn. 5 above).

<u>Colville</u> ¹	<u>Twana</u>	<u>Gloss</u>
k. kílɣ	c. čálaš	hand
keláɣ ^w	čálaɣ ^w	evening; morning
tx ^w ck	sədax ^w cáč	tongue ²
'úpənkst	ʔópədəčs	ten ³
sənkə́míkəp	səx ^w tál'čəd } ~ caléčəd	back ⁴
x. kílɣ	š. čálaš	hand
scuxáén	yəšád	foot ⁵
su·míx	səʔwádaš	spirit power ⁶

Fig. 55.--Salish k - č, x - š

¹The Colville forms are from Vogt (1940). The point at issue being clear enough, I have not presumed to normalize Vogt's

Fig. 55.--cont.

transcription. As I have already noted, Salish comparative studies are in their infancy, and the vowel equivalences are unclear, as are also the conditions for vowel-loss (but see Chap. II, sec. 11, (Summary), for vowel-loss in Twana).

²s- in the Twana form is obviously *s Nominal. *tx^w for other Salish often corresponds to prefix dax^w- in Twana.

³*ʔópan or *ʔópən is the probable stem here. The suffixes vary across Salish.

⁴Here, only the bound pronominal suffix *ékan, 'back' is common.

⁵Again, the bound pronominal suffix *xVn, 'foot' is common.

⁶Perhaps not cognates at all. Certainly the alternation m~(*n)d is a problem. Cf. also Flathead su·méš, suméš (Krueger); perhaps the (long?) u has rounded the [+Nasal] segment following (Hamp, personal communication). This would have occurred in certain (marked) lexical items only, for no such regular alternation has so far been noted.

Figure 52 presents forms in which č̣ and ṣ̌ are in free variation with č̣ and ṣ̌, the latter never appearing without the former also occurring, although many forms show only (plain) ṣ̌ and č̣. So far as the dictionary representation of these forms is concerned, sub-corpus (c) shows the relevant consonants in positions where no morphological alternations occur, and a synchronic grammar could do no more than add a remark to the entries themselves. A form like 'bone' would carry the morpheme-feature [optionally insert y-glide].¹

However; the occurrence of forms such as those under (a) and (b), together with the forms of Figures 53, 54 (the ⁽²⁾k-forms of Twana) raises an interesting problem. Comparative studies (illustrated all too briefly by Figure 55) have shown that Proto-Twana non-rounded k and x shifted to palatal č̣ and ṣ̌ respectively, quite possibly as an unconditioned sound-change.² Clearly, however, whether by re-borrowing or by 'exception,' some

¹That is, such a form is subject to a minor rule of the Phonological Component.

²If a conditioned change, then one quite beyond reconstruction, at least within Twana; not only have extensive vowel-shifts obscured the

(?) k-forms remain in Twana.¹ It is plausible to hold, then, that the problem-forms of Figure 52 (the č, š alternants) represent a relic medial stage of the original sound-shift, and the question is, whether the grammar ought not in some manner to recapture this notion.

The simplest manner in which the notion outlined might be recaptured in the grammar would be to represent all (historically) originally k/x forms with k/x, in the dictionary. Those segments which are to become č and š must then pass through the following three rules.

1. $\emptyset \longrightarrow y$ in env. / $\left[\begin{array}{l} +\text{Cons} \\ +\text{Back} \\ +\text{High} \\ -\text{Round} \end{array} \right] -$
2. $[+\text{Cons}] \longrightarrow \left[\begin{array}{l} -\text{Back} \\ +\text{Coronal} \end{array} \right]$ in env. / $- y$
3. $y \longrightarrow \emptyset$ in env. / $[+\text{Cons}] -$

The first inserts a palatal glide after non-rounded velars.² The second palatalizes k,x with following y: note that the only clusters of consonant + y at this stage are the ones newly created, which simplifies the specification in the left hand side of the rule. The third rule deletes the y, following palatalization.

However, to the first and third of these rules there is a class of exceptions or optional exceptions. To the first rule the exceptions must be all those forms which show k' or x in Twana. We shall take here only the k forms, as typical of the problem.

Some fourteen Twana forms containing k occur in the total corpora. Of these (as the footnotes to the corpus indicate), four are obvious English loans, perhaps mediated by Chinook Jargon, while four others ('urinate,' 'mummy,' 'granny,' and 'shut up!') are characterizable as affective. All of these, whether by direct or indirect³ marking of dictionary entries, must be made exceptions to the rule for development of y-glide.

original 'environments,' but many finally-occurring č/š give us no following environment at all. In what follows, I assume an unconditioned change, but also discuss alternatives for Twana.

¹For the status of x as a possibly 'relic,' see Chap. II, sec. 15.2, and the argument below (p. 193).

²The rounded (and glottalized rounded) front velars survive, as do all the back velars.

³'Direct' marking involves the use of a direct instruction, such

There are no exceptions to the second (palatalization) rule.¹ So far as the (optional) exceptions to the third (glide-loss) rule are concerned,² only direct dictionary marking is open to us. Thus, a form like 'bone' will be marked [Optionally not glide-loss rule]. However, we note that the alternants \acute{s}/\acute{c} never occur in the reduplicating syllable of the Augment, nor in the stem except in the segment adjacent to a stressed vowel. The constraint is simply one of proximity to stress; it is not clear, however, where this constraint is to be noted, in view of the fact that the option on glide-loss seems only to obtain with a small number of lexical items. Perhaps we may mark the rule [optional for marked forms, when adjacent vowel is stressed].

It remains to order these rules with respect to the rules already given.³

Taking	s-táčəd:	s-tčtáčəd	slave: Augment
	s-táq :	s-qtáčq	log jam: Augment
and	ʔas-ǵáx ^w :	ʔəs-ǵx ^w ǵáx ^w	frozen: Augment
	šəx ^w ab :	x ^w šəx ^w ab	wind: Augment

We see that the present rules must operate before those for cluster-simplification:⁴ t is not lost before č, while it is before q; similarly, q is not lost before x^w, while š is so lost. It is not clear whether any earlier rule must similarly be preceded by the present rules: they are thus operable at any point before cluster-simplification except that, to avoid complicating the constituent structure rules, they cannot operate immediately post-dictionary.⁵

as [not rule X]. 'Indirect' marking involves a feature (such as [Foreign]) which in turn correlates with a condition (such as 'Not in [+Foreign] words') attached to a rule.

¹But compare the [x^y] allophone of /x/ in Quinault (Gibson, 1964), and the [k^y] allophone of /k/ in Chilliwack Halkomelem (Harris, 1966).

²We note that only plain (not glottalized) k is involved.

³I am not aware of the need to intercalate any other rules among these, and thus suppose them to be passed in a block.

⁴See Chap. II, sec. 7.

⁵They are tentatively placed immediately after the rules for constituent structure.

Some support for the above analysis comes from the discussion of Affix-truncation (Chap II, sec. 15.2). Forms such as *spéx^w* 'gull' giving *spéx^w-s* (which apparently contradicts the 'remoteness of stress' condition on the truncation rule), led us to adopt the view that we have to do with xw clusters. This, of course, is to say that (perhaps only in certain marked items) the environment / -w is a possible relic environment for proto-Twana x.¹

The above solution, while interesting in its implications for Proto-Twana,² nevertheless fails to meet the criterion of recoverability by alternation (Kiparsky's 'alternation principle'), by virtue of which it is more reasonable to assume that forms always heard as (e.g.) *č* are to be so represented in the dictionary. In this case, *k* forms are represented as *k*, and the alternating forms also simply marked as alternating.

However, there is yet a third possibility, one which avoids both extremes--that of over-abstractness (the 'underlying k' solution), as well as that of over-concreteness (the 'write it as it is' solution). It is possible to re-interpret the form (e.g.) *šáw?* as underlyingly **šéáw?*,³ provided that it can be shown (a) that the cluster is not anti-canonical, at least for underlying shapes, and (b) that the reduplication rules for both Augment and Attenuative can be simply modified to handle the complication.

There is no synchronic evidence that vowel clusters occur within morphemes in Twana,⁴ and it is certainly most unlikely that the present cases of initial *če-* and *še-* constitute separate morphemes. On the other hand, the constituent structure rule for Attenuative has been allowed to create

¹Compare the 'relic' environments for underlying Nasals (Chap. II, sec. 8). In both cases, the notion 'relic' is captured by the condition-features in the rules by which the rest of the occurrences are transformed into segments of different feature composition.

²I have in fact hazarded this solution so far as the representations of underlying forms in the text of the Tale are concerned.

³Or even **šyáw?*. Compare, for example, Pentlatch (sic) *ciā'ō* 'bone' (Boas [1888]).

⁴The only forms I have in which a surface cluster cannot be attributed to an option on the -insertion rule are those in which lenis articulation of y in unstressed syllables (pre-tonic) occurs, giving (e.g.) *beopéta'wəl* 'fighting,' from **be-šyopé-* (?).

geminate vowels, although these are always later resolved by the insertion of glottal stop. It has also been suggested that the only initial clusters in Twana morphemes are those including $h/\text{ʔ}$; here it is possible that we must extend this characterization to include clusters containing y^1 as second element.

Suppose we insist that, as a result of whatever complex restructuring, clusters such as $\check{e}V$ (or, $\check{y}V$) survive in the forms we are handling. Can the rules so far established handle the complications? For the Augment, note that the optional palatalization never appears in the reduplication. We thus need only amend the constituent structure rule to allow an \underline{e} plus dissimilar vowel (or yV) cluster between C_1 and C_2 of the reduplication, provided the following two rules are added. First, an optional rule will then assimilate the \underline{e} (or y) to the \check{c}/\check{s} segment. Second, for the cases where the option is not taken, the first of two dissimilar vowels (or, y in / $C - V$) is simply deleted. Thus:

1. $\check{s}/\check{c} \left\{ \begin{array}{c} e \\ y \end{array} \right\} \longrightarrow (\text{opt}) \check{s}/\check{c} \text{ in env. / - Dissimilar Vowel.}$
2. $\left\{ \begin{array}{c} \text{Vowel} \\ y \end{array} \right\}_2 \longrightarrow \emptyset \text{ in env. / } \left\{ \begin{array}{c} - \text{Dissimilar Vowel} \\ C - V \end{array} \right\}_2^1$

Rule 1 above was framed using the environment 'dissimilar vowel' to ensure that the geminate vowel created by the Attenuative constituent structure rule is not assimilated or deleted, as in a form such as (Attenuative) $*\check{s}\check{e}\check{c}h-\check{s}\check{e}\check{c}$ (from $*\check{s}\check{e}\check{c}$, 'pay'). But clearly, the Attenuative form of $*\check{c}\acute{i}\acute{a}l\acute{a}\check{s}$ would be $**\check{c}\check{e}-\check{c}h-\check{c}al\acute{a}\check{s}$, which would result in $**\check{c}\check{e}'\check{e}\check{c}ol\acute{o}\check{s}$ instead of the correct $\check{c}\check{a}'\check{a}\check{c}ol\acute{o}\check{s}$ by the rule for Laryngeal affection.

We must thus amend the constituent structure rule. If reduplication of CVV (or, CyV) is allowed, the two new rules would apply to the reduplicating syllable as well as to the stem.²

Alternatively, since the palatalized \check{c}/\check{s} never appear in the reduplication, we may avoid the need to mark the assimilation rule as 'obligatory in reduplicating syllable' by slightly complicating the constituent-structure rule. Thus:

Attenuative Reduplication = $C_1V_1\check{V}_1h$; for Stem $C_1(V \text{ or } y) V_1$.

¹In SPE features, simply segments [+Son, -Syll, -Round].

²The ordering of the new rules is straightforward: if they both apply before the ʔ -insertion rule, the latter may refer simply to 'vowel sequence.'

IV.3.6. Rounding

(a)	šóšok ^w əle(h)	Jesus Christ ¹
	bók ^w	book
	q ^w éšó(h)	pig
	k ^w ót	cape
	k ^w eʔk ^w ót	cape (Attenuative)
<hr/>		
(b)	sók ^w aʔ	sugar
	sx ^w óp	hoop

Fig. 56.--Rounding Assimilation

¹'Jesus Christ.' We must suppose a re-evaluation of [šesju] as *šéšo, then a re-interpretation of the first syllable as a reduplication šé-šo - , with a stress-shift to the 'stem,' giving šé-šo- . Vowel assimilation (uncanonical) would then make the unstressed reduplication vowel into o, whereupon a further rule (optionally?) gives the stress to the 'prefix' again.

Note: The $k \rightarrow k^w$ shift is not considered as rule-produced for forms such as these: rather, it is a condition on the shapes of Twana dictionary entries--that is, a morpheme-structure condition. See p. 196.

Rounding in consonants is confined to segments which are [+Back, -Low], i.e., velar and post-velar k/x and q/x .¹ The analysis of reduplication already given shows clearly that no question of re-analysis of segments such as k^w as clusters (kw) arises generally, although there may be such clusters in Twana--one such case was discussed earlier.

Two constraints on the contrast [+Round] vs. [-Round] must be re-

¹See (Chap. IV, sec. 3.5) back for the question of the possible survival of *x in certain rare environments in Twana. The morpheme-structure constraint on Roundness to Back consonants is probably pan-Salish: the so-called /t^w/ of Snoqualmie-Duwamish (Tweddell, 1950) is almost certainly to be re-analyzed as /tx^w/; with very light friction, as in Twana, S-D /x^w/ probably merges with /hw/, and the [h] element may then be lost. Cf. Tale, note 5(d), Appendix I, sec. 5.1.

ferred to. The first concerns dictionary entries, and the second the rules of the grammar.

The Corpus contains no instances of either of the sequences Rounded Vowel plus Non-Rounded Velar Consonant or the 'mirror' sequence within a morpheme. There is thus a morpheme-condition to be added to the Phonological description, excluding such sequences (see Fig. 56).

However, a question arises concerning the dictionary entries for morphemes with initial velar followed by a Rounded vowel. It might be argued that these velars should be represented as [-Round], to be adjusted by the Rounding neutralization rule. However, the 'alternation' principle militates against this suggestion, while the reduplication of the Augment (with its accompanying vowel-loss) in fact recovers all cases of velar plus rounded vowel unambiguously as [+Round]. Thus $k^w\acute{o}y$ 'bend,' gives $k^we'k^w\acute{o}y$, while $\text{'as}\acute{q}^w\acute{o}\lambda$ 'hidden' gives $\text{'as}\acute{q}^w\acute{o}\lambda^w\acute{o}\lambda$.

In addition, the (for Twana, at least¹) automatic labiality associated with Rounding is very strong in both consonants and vowels.² In k^w , x^w , etc., the co-articulation is simultaneous with, or even anterior to the closure or constriction of the consonant. On the other hand, co-articulation with following Rounded vowels is so strong that the contrast (e.g.) \acute{q} vs. \acute{q}^w is neutralized in these cases. Thus, $\text{'ya}\acute{q}-\acute{o}s-$ 'file something' and $\text{'ya}\acute{q}^w-\acute{o}s-$ 'wash face' are both heard as $[\text{'ya}\acute{q}^w\acute{o}s-]$.³

The writing of a suitable rule to convey the facts of Twana Rounding neutralization is a simple matter. Thus:

$$\begin{bmatrix} +\text{Cons} \\ +\text{Back} \\ -\text{Low} \end{bmatrix} \longrightarrow [+Round] \text{ in env. } / - \begin{bmatrix} +\text{Syll} \\ +\text{Round} \end{bmatrix}$$

Notice that the facts concerning the degree of Labiality and co-articulation are not, however, conveyed by such a rule: as matters of theory stand today, they are to be added, if at all, as very low-level rules concerning fine details of articulation.⁴

¹Cf. the description of Rounding in Tillamook as 'cupping of the tongue,' without rounding of the lips (Thompson [1966]).

²Cf. the discussion on shwa in co-articulation (Chap. IV, sec. 4.4.2.2).

³Cf. $\text{'as}-y\acute{q}$ 'filed'; $\text{'as}-y\acute{q}^w$ 'washed.'

⁴For example, the exact degree to which \underline{a} is optionally raised and rounded when abutting a rounded consonant, without ever merging with the corresponding (+round) vowel, \underline{a} . I discuss elsewhere the possibility that a 'superordinate' definition of tract-configuration (the 'Basis of Articulation') will handle such details.

IV.3.7. Secondary Aperture

IV.3.7.1. Nasals, Loans, and the Nasal Sound-Shift

IV.3.7.1.1. General

<u>m</u>	méri	Mary ¹
	mélk	milk ^{2,9}
	máynarílz	Myron Eels ^{1,9}
	skólman	teacher ²
	mólə(h)	mill ³
	maliyečəd	I marry ³
	mam'ás	thin
	mal'əxəl' eč	tin can ⁴
	ʔas-máx'	proud
	má'əh	daddy
	mé'ə	defecate ⁵
	tam'éləd	rope
	čəməq ^w ap	short-tail
	čəməx ^w qs	sharp-nose
	čəmə'te'əps	spine ⁶
	š-čəmə'əp	backside
	kək'əmal	small ⁷
	x ^w ésqam	few ⁸

Fig. 57.--Nasals - m

¹ 'Mary' and 'Myron Eels' occur in Tales. The importance of the metathesis of 'Myron' cannot be assessed from Twana data alone. The only productive metatheses I have found concern šəy and Ch. But metathesis is held to be a grammatical process in Clallam, one of the languages spoken by Mrs. Pulsifer. See Thompson (1968). Compare also Mrs. Pulsifer's rendering of the name 'Gabriel' as [gréibivʔ].

² 'Milk, teacher' are most likely to be direct English loans. Note that they lack the plural or diminutive shaping often found in Chinook Jargon loans.

Fig. 57.--cont.

- ³'Mill' and 'marry' are from French, although possibly not directly from Canadian French but rather through Chinook Jargon. 'mill' gains a final h (automatic to a final vowel?); 'marry' must also be assumed to carry final h (ʔəd, 1st pers. sing.), which lowers the original é-vocalism (laryngeal affection).
- ⁴'Tin can.' -Vleč-ad, bound pronominal, 'container.'
- ⁵'Defecate' must be marked [not laryngeal affection], since it retains éʔ: but this form may be *mélixʔ.
- ⁶'Rope,' 'spine.' These forms show a glottal stop after m not matched in the corresponding Puget Sound forms, which show plain b. The form for 'rope' is especially interesting, since the glottal stop seems not to have arisen from a lost vowel: if this is indeed the underlying shape, then we probably have here further confirmation for the notion that glottal stop is absorbed by, then lost in association with a voiced stop.
- ⁷'Small' is commented on in fn. 2 to Fig. 54, so far as its shape is concerned. Its provenance is unknown; certainly it is not a loan from the Puget Sound dialects, which uniformly (?) have memʔəd for 'small.'
- ⁸'Few.' Cf. x^wésay, 'bad,' (with ʔáy 'good'?) Is x^wés a negative particle, to be compared to x^wáʔ, 'not'?
- ⁹In 'Mary' and 'milk,' [e] is [-High,-Tense]: Cf. [e] denoting [e^v] elsewhere in this thesis, defined as [-High,+Tense]. In 'Myron Eels,' [ɪ] is [+High,-Tense]; cf. [ɪ] as an allophone of /ə/ (Fig. 65(c), Chap. IV, sec. 4.4.2.2).

		Gloss
n	s-nənəkéyə(h)	diving duck ¹
	ʔənós	Chinoos ²
	ʔólenʔos	orange ³
	ténten	bell ⁴
	wáʃéntən	President
	skólman	teacher
	s-pópan	spoon ⁵
	s-péʔpon	tea-spoon
	ʔépan	apron ⁶
ŋ	x ^w éx ^w əŋ	cry-baby ⁷

Fig. 58.--Nasals - n, ŋ

Fig. 58.--cont.

- ¹'Diving duck.' Appears to be reduplicating, from a root (?) *nakéyah(?) Provenience unknown.
- ²'Chinoos.' A place-name.
- ³'Orange.' A common characteristic of loans through Chinook Jargon is the plural formation used as a singular (see also 'priest' in fn. 6 below).
- ⁴'Bell.' From Chinook Jargon. Twana also derives the form dæ^wtéleq^wabəd, 'bell,' from *téleq^w, with Nominalizing prefix-suffix complex dæ^w-bd.
- ⁵'Spoon.' An Attenuative formation, but irregular: we would expect sp³pən, were this a Twana formation, from *s-pón. An alternative Attenuative formation for 'spoon' is based on a putative *s-póhn (see 'Laryngeal-final Attenuative,' Chap. III, sec. 6.2).
- ⁶'Apron.' Proto-Salish r merged with l. in most Salish languages. No trace of original r remains in Twana. Cf. the (French-origin) loan lepléd, 'priest'--with the plural French Article as part of the stem for the singular (see also 'orange' above).
- ⁷'Cry-baby.' This was Mrs. Pulsifer's Clallam childhood nickname. Clallam has ŋ for proto-*m, which makes this form similar to Twana **x^wox^w-ab, from x^wox^w, 'fat.'

There are eighteen m-forms, of which four are from English (two being proper names) and two from French (possibly through Chinook Jargon). Of the remaining twelve, six ('thin,' 'daddy,' 'defecate,' 'backside,' 'small,' and 'few') may be considered as affective. This leaves six forms to be accounted for only as loans,¹ possibly from neighboring Puget Sound dialects.²

On the other hand, of the nine n-forms, six are English loans and one is a place-name; this leaves only 'bell,' which is clearly an onomatopoeic

¹'Corpus m/b, n/d in parallel environments' suggests we discount the likelihood of any of these constituting 'relic' nasals in rare environments. While n only occurs once initially, m only occurs once finally; I have no comment on the possible significance of these distribution-limitations.

²Except 'small'--see notes on m-corpus (Fig. 57).

formation borrowed from Chinook Jargon, and the form for 'diving duck.' The solitary -form, in turn, is a palpable Clallam loan.

	<u>m</u>	<u>Gloss</u>	<u>b</u>	<u>Gloss</u>
Initial	'asm ^h	proud	'asb ^h	sated
	mól ^h (h)	mill	bóle(h)	spring (water)
Medial	skólman	teacher	séllbad	half-brother
	tam ^h éi ^h ad	rope	tabé ^h dabac	hair (on body)
Final	x ^w esqám	few	stáb	what?

	<u>n</u>		<u>d</u>	
Initial	snənákéya(h)	diving duck	sədadašed	footprints
Medial	skólman	teacher	séllbad	half-brother
Final	'épan	apron	pəd	time
	spópan	spoon	tá ^h tad	cedar-bark skirt

Fig. 59.--m/b and n/d, in Parallel Environments

	<u>Twana</u>	<u>Upper Chehalis</u> ¹	<u>Gloss</u>
* /m/	b ó s as	mús	four
	báq ^w ab	máq ^w m	field
	-bš	-mš	people (pronom.)
	tabéd	tamén	hair
	dawd ^h ábac	náwnamc	tree-trunk
	spáq ^h b	spáq ^h m	flower
	k ^w aléb	k ^w álm	drying rack
	-b	-m	[verbalizer]
* /n/	da ^h wéh	náwe	you (sing.)
	dacá ^h	'áncə	I
	cadéi	cáne	he, she, it
	'éda ^h wat	(e)nówt	heart
	'ópədačs	pánačs	ten
	wadaw ^h	wnáw	horn
	-pəd	-pón	time
	bəščəd ^h	məščn ^h	head-louse

Fig. 60.--Comparison of Twana b/d, Upper Chehalis m/n

¹Kinkade (1963).

As will be seen from the corpora, Twana possesses both the nasals *m*, *n* and the voiced obstruents *b*, *d* (Fig. 59). Superficially, no special problem is presented by such a situation. However, the total corpus of forms containing nasals is extremely limited. What is more, as has been shown (Chap. II, sec. 8), the contextual variants of *b*, *d* are such that we must suppose these to be the output of underlying nasals *m* and *n*, quite apart from the comparative evidence showing conclusively that such is their historical source (see Fig. 60 for a small sample of such evidence).

Since the substitution of voiced stops for nasals¹ is extremely rare as a sound change,² it seems worthwhile to attempt some explanation of what may have occurred, at least in the case of Twana. However, the proposed explanation concerns the micro-timing of the muscle-commands for nasalization and voicing; thus, rather more details concerning physiology will be presented than are perhaps normal in discussion of phonology.

IV 3.7.1.2. Physiological Considerations

Nasals have already been characterized as [+Sonorant, +Consonant, -Syllabic]. We may illustrate the speech-ready (or, 'Neutral position') adjustment of the velo-pharyngeal port by contrast with its action in quiet breathing and swallowing.

In quiet breathing, the velum is lowered, thereby allowing air to pass through the nose. In swallowing, a strong sphincter-like contraction of the palato-pharyngeal valve is observed, which completely disappears between swallows.³ Before and between swallows, the muscles concerned show no 'tonus,' as monitored by EMG. On the other hand, it has been shown that

¹In virtually all instances (see Figs. 57, 58 and footnotes there for exceptions).

²Apparently occurring only in this one area, the northern part of the Olympic Peninsula: the languages concerned are the Puget Sound dialects and Twana (both Salish), as well as Quileute and Nitinat (both Wakashan). Since these languages are all members of the Mosan phylum, and thus genetically as well as areally related, it should be pointed out that the sound change is areal and not genetic in origin: although it occurs in all three branches of Mosan, it is confined to two sets of geographically contiguous languages.

³Bloomer (1953).

while the sphincter action (which involves the pharyngeal constrictors, as well as the velum-raising levator and tensor palatini muscles) is in speech small or nil,¹ the velum-raising muscles themselves are active as much as 600 msec before audio onset,² often continuing active throughout the utterance.

This speech-general tonus is shown by x-ray cinematography³ to raise the velum and hold it somewhat half-closed.⁴ Then, for non-Nasal consonants, the velum is further raised, closing the port more or less tightly; while for vowels, the port is nearly (but not quite) closed, remaining proportionately less closed for the lower (especially front) vowels. However, for Resonant consonants, as of course for vowels, the over-all tract stance remains such that voicing will be 'spontaneous': most particularly, Nasals are therefore 'unmarked' for voicing.

The problem of the sound-change 'Nasal to voiced stop' may thus be usefully re-phrased as an attempt to explain how a stop unmarked for voicing is replaced by one marked for voicing, for this is the essence of the rarity of the change.

Let us assume that the completion of a nasal includes at least the following events in sequence. The velum, which is somewhat half-down (as suggested above), is lowered further;⁵ the tongue (or lip) contact is made. If the following segment is a vowel (e.g.), a 'raising' command must reach the palate sufficiently early to ensure no perceptual nasalization of that vowel. The crucial parameter to be examined is that of timing. Let us suppose that the command to raise the palate (in anticipation of the following segment) is advanced; or, conversely, that the oral (or labial) release is delayed. In either case, an oral occlusion will obtain; however, with the nasal-bleed pathway severely constricted, the supra-glottal pressure increase will very quickly cut the Bernoulli effect across the glottis to a point at which spontaneous voicing can no longer be sustained.

¹Bloomer (1953).

²Fritzel (1963).

³Björk (1961)

⁴But cf. Chomsky-Halle (1968): 'In the neutral position, the velum is raised, and the air-flow through the nose is shut off' (p. 316). In either case, we are saved from the absurdity of having to 'mark' [-Nasal], a logical necessity if we held that the velum moved from the rest (i.e., breathing) position for every non-nasal segment.

⁵Probably by a positive command to (at least) the palatoglossus muscle, implicated by Fritzel (1968).

Two possibilities are presented. The stop tail-off of the originally nasal segment may simply unvoice, giving [nt̚]. On the other hand (and this seems to be the case for Twana), voicing may be maintained, probably by the adjustment of the stance of the glottis.¹

(a)	^m bósas	~	bósas	four
	^m báčay	~	báčay	snake
	^m báleʔas	~	báleʔas	raccoon
	ⁿ dáqas	~	dáqas	one
	ⁿ dəčəŋəd	~	dəčəŋəd	once
	ⁿ dəsxáʔ	~	dəsxáʔ	I like it
<hr/>				
(b)	tqáʔmdəx ^w	~	tqáʔbdəx ^w	make bread
	səʔwəsəmdəx ^w	~	səʔwəsəbdəx ^w	flooding
	xəčənbəd	~	xəčənbəd	a landing
<hr/>				
(c)	{ yabéd	:	sičét	fruit : day
	{ yabél	:	sičétl	our fruit : our day
	{ lék ^w ad	:	čəʔwát	he says : he's fine
	{ lék ^w áčəd	:	čəʔwátčəd	I say : I'm fine
	{ səx ^w tálʔq ^w əd:	sʔóbat ~ sʔóbát		back of head : name
	{ səx ^w tálʔq ^w əs:	sʔóbats		back of his head : his name

Fig. 61.--Contextual Variants of Twana Nasals

IV.3.7.1.3. Allophones of N, Allophones of B

Within the framework suggested, it is now possible to explain the source of two of the contextual allophones of *m,n in Twana, viz.,

¹Perhaps aided by the laxing of the pharynx, to assist 'containment' of the over-pressure in the oral chamber. For the original report, see Halle-Stevens (1967). Ohala's EMG tests implicate the inter-arytenoid muscles (personal communication), which tends to support the Halle-Stevens hypothesis.

Note that a lowering of the larynx would also subserve the maintenance of voicing; but no suspicion of the resultant implosive character of such a stop appears in Twana.

(a) initially, b,d have optionally a nasal onset (Fig. 61[a]), (b) stem-morpheme finally, the nasal optionally survives as such before a dissimilar nasal (Fig. 61[b]).

From the work of Björk already referred to, we note two trends: first, that initial closure to the speech-ready position takes place even when the first segment of the utterance is a nasal; and second, that the closure-time within an utterance is shorter than that for the speech-ready adjustment (approximately 150 msec vs. 260 msec). It follows that, if post-nasal raising is advanced in time, the shorter (speech-medial) open time will be sharply curtailed, while the longer (speech-initial) open time will be only slightly curtailed.

Thus an utterance-initial nasal will become in effect a pre-nasalized stop, but a medial nasal will become a simple voiced stop. It also follows that while the second of two nasals will have its open time curtailed, the first will retain its full 'length' since it is not followed by a 'raising' command:¹ this would account for the morpheme-final allophones.²

An important consequence of assuming the mechanism outlined above is that the rules representing these processes must not assume that all segments go through two stages, viz., N to pre-N, pre-N to non-N. Rather, the speech-initial and non speech-initial positions have their independent developments.³ Moreover, clarity of exposition (if not additional explanatory power) is probably to be gained by incorporating the timing factor in the rules--one simple way of doing which is to represent nasals as two-part segments. Thus, taking utterance-initial as an example:

$$\begin{bmatrix} +N & +\text{Sonorant} \\ & +N \\ & -\text{Cont} \end{bmatrix} \longrightarrow \begin{bmatrix} (+N) & -\text{Sonorant} \\ & -N \end{bmatrix} \text{ in env. / \$ -}$$

The argument for the two-part representation of a segment here concerns the nature of the segment-onset: this has a direct parallel in the case of

¹Note that this provides a physiological basis for the classical notion of 'protection,' at least for the case in question.

²We recall that the rule for geminate simplification will by this stage of the rules have dealt with the clusters m&m and n&n, so that only dissimilar nasal clusters remain.

³The requirement for 'option' in these rules seems to result from the pressure of analogy: all *N tend to become B.

SPE's analysis of affrication¹ as demanding a feature of release. There may well be a case for a three-part segmentation into Onset, Steady-state, and Release, at least for certain types of segment.

IV.3.7.2. Laterals

There are three laterals in Twana: $\lambda^?$, λ , and l . $\lambda^?$ is distinguished from the other two laterals in two ways; it is glottalized, and it is (heavily) affricated. Since Stridency (Chap. IV, sec. 5.3) plays a very minor role in Twana, whereas glottalization is a dominant feature, we choose to assign glottalization as the minimally distinguishing feature of $\lambda^?$; thus, for example, the rule defining the conditions for development of a syllabic off-glide of λ (Chap. II, sec. 20.3) need specify λ in terms of [-Glottal Constr] rather than [-Strident].

In turn, voice need play no part in the distinction between laterals. To distinguish λ from l (in the same rule, for instance), [+Continuant] might be used, provided l is at the same time defined as a 'stop,' i.e. [-Cont]. As will be shown below, however (Chap. IV, sec. 4.1.), l is best considered the Sonorant Lateral, as against non-Sonorant λ and $\lambda^?$.

IV.3.8. Other Voiced Obstruents

IV.3.8.1. General

	<u>Twana</u>	<u>Nisqually</u> ¹	<u>Gloss</u>
(a)	yadés	ʒadés	tooth ²
	syal.áb	ʒálədb	year ³
	yapáče(h)	ʒaláčeʔ	five ⁴
	yəšəd	ʒəšəd	foot ⁵
(b)	ʔwəd	g ^w ədələx ^w	down; sit down
	wədəbax ^w	g ^w ədɓex ^w	blackberry ⁶
	də'wáh	dəg ^w eʔ	thou ^{4,7}
	šə'wál	šəg ^w əl	door, road
	wədawʔ	g ^w ədək	horn ^{8,9}
	słə'wədɓəd	səgədək	armpit ⁹

¹See Chap. IV, sec. 4, 'Manner Features.'

<u>Twana</u>	<u>Nisqually</u>	<u>Gloss</u>
(c) bəɫálg ^w (h)	bəɫálgəʔ	navel ⁴
wəqəb	wəqəb	box ⁶
g ^w édəq	g ^w édəq	gweduck (clam) ¹⁰
hódolg ^w əɬ	hódalg ^w əɬ	steamer ¹⁰

Fig. 62.--Comparison of Twana y/w, Puget Sound ʒ~j, g~g^w

- ¹ Nisqually forms are taken from A. Malikouti-Drachman (1964, 1965).
- ² Generally, an alternation of stress is seen between the Nisqually (Nis.) and Twana (Tw.) forms. From the study of the Augment, it is reasonable to suppose that, if the shift is by rule, Twana shows the earlier (underlying?) stress pattern in such forms as 'tooth'; for Twana, the V-a alternation would not operate were the stress **yádes.
- ³ 'Year.' Twana offers several examples of *l+ stop where either the stop or the l is lost. Cf. 'five,' where Nisqually has lost the p.
- ⁴ 'Five,' 'thou,' and 'navel' show an alternation between ɹ and h for Nisqually and Twana.
- ⁵ 'Foot.' The usual Puget Sound (Pg.S.) reflex of *y is ʒ. If j is contextually determined, the present data does not show how.
- ⁶ In general, Pg.S. g^w corresponds to (and derives from) Tw. ʔw. Cf. 'box,' which illustrates w=w-. But 'blackberry' shows no ʔw: here ʔ has been lost remote from the stress, as also in 'horn.'
- ⁷ 'Thou' illustrates the rule for laryngeal affection in Twana: Nisqually shows the underlying é-.
- ⁸ 'Horn' Here the final g^w has lost labiality as well as voice in Nisqually.
- ⁹ 'Armpit.' Here compare only the morpheme Tw.-ɬwəp- with Nis.-gəp-. As with 'horn,' Nisqually shows loss of labialization, as also in 'navel.'
- ¹⁰ 'gweduck' and 'steamer' are thus supposed to be loans in Twana from Puget Sound.

		Gloss
	ʔəʔələʔleʔ	Seattle ¹
	ʔəʔg ^w əʔ	bogey, monster ¹
ʔ	ʔólenʃos	orange ²
	ʔəʔənz	onion ²
	sóʔsəʔlʃos	soldier ²
g	ʃagáq	carrot ³
g ^w	g ^w édəq	gweduck
	hódəlg ^w el	steamer ⁴
	ʔəʔg ^w əʔ	bogey, monster ¹
	bəlálg ^w ə(h)	navel ⁵
	cáxəg ^w as	half-breed ⁶

Fig. 63.--Twana Voiced Obstruents, non- b/d

- ¹'Seattle,' 'monster.' These forms are identical with Puget Sound forms. If 'Seattle' is to be glossed as 'cousins,' then this form is to be added to the list of forms showing Twana y = Puget Sound ʔ, as in Fig. 62.
- ²'Orange,' 'onion,' and 'soldier' show the common plural borrowing-shape. Compare French loan lépəwəh from 'les pois.'
- ³'Carrot.' I do not know the cognates, but the g could come from (1) ()w → g^w → g, or (2) k^w → g^w → g. The form is certainly not from Chinook Jargon, which has the expected (French-loan) kalat.
- ⁴'Steamer.' In all likelihood from Puget Sound, although the vocalism in Nisqually (e.g.) shows a (hódəlg^wel). Twana does not possess hód 'burn' (cf. Twana ʔasq^wət, 'fire'), and shows -ʔwél as bound pronominal for 'vehicle, canoe.' (See Fig. 62, correspondences ʔw = g^w).
- ⁵'Navel.' Twana here shows g^w against Nisqually g. But there is other evidence for a g^w ~ g alternation in Nisqually: in any case, I do not doubt that 'navel' is borrowed from some Puget Sound dialect.
- ⁶I am unable to account for 'half-breed.'

Besides forms with m,n Twana also contains forms with the voiced obstruents ʒ, ʝ, g, g^w. It will be clear (from Fig. 62 and 63, with their footnotes) that many such forms are in all probability loans from the Puget Sound dialects, which will be seen to possess a full set of voiced obstruents (b, d; ʒ, ʝ; g^w--though not g, except contextually-determined). The remaining forms are obviously loans, originally from English or French, though often through the Chinook Jargon.

When we see such loans in parallel with the existence of b,d forms, it is tempting to suggest that their acceptance depends on what amounts to phonological analogy; that is, that the presence of b,d allows for the acceptance of ʝ, g, and the presence of k^w in turn allows for the acceptance of g^w. Support for this view might be offered by citing the case of forms like English 'coffee,' 'thousand,' borrowed as kápeh, táwsəd. Twana has no continuant f or ʃ, and loans like this are adapted.

On the other hand, if we examine languages like Coeur d'Alene (an 'Inland' Salish language), we note the development of d, g^w in native forms (this time with supporting loans in b). In turn, 'Coastal' Comox has ʝ, g^w, but without b,d, while Quinault has contextually-determined ʝ, g^w (related to y,w) again without b,d.

IV.3.8.2. The Trend to Obstruence

It is thus suggested that the development of voiced obstruents in Salish represents but a single trend,¹ that of change of non-syllabic sonorants to obstruents, with a concurrent switch of voicing from 'spontaneous' to 'non-spontaneous.' In Coeur d'Alene, this trend has been confined to the voiced non-consonantal non-vocalic sonorants (w,y,--for here d is from y, not from a nasal), with covert support for foreign loans in b. In the Puget Sound dialects, the trend has gone furthest, with overt development of a full set of voiced obstruents. On the other hand, Twana has so far confined its overt development to the sonorant nasals, with covert support for the small number of ʒ/ʝ and g^w loans given.

¹'Trend,' not 'Drift': no Sapirean 'drift' is implied in the sense of functional connection; rather, an articulatory tendency.

IV.3.9. Glottal Constriction

IV.3.9.1. Degrees of Glottal Constriction

'Glottal constriction' obtains when the glottal aperture is narrowed beyond its speech-ready stance.¹ In Twana, two degrees of glottal constriction must be recognized in the output, although it will be suggested that the second (partial constriction) is contextually determined.

As is clear from the corpus of surface contrasts (Fig. 48), the glottalized voiceless non-continuants² are in contrast with their non-glottalized counterparts, except that no plain counterpart to ~~x~~³ occurs. For this set, glottalization consists of total constriction of the glottis.³ But glottalization also occurs with non-syllabic sonorants,⁴ although never with voiced non-sonorants: the nature of this glottalization on the one hand, and this exclusion on the other, are of considerable interest for an understanding of Twana.

It is assumed (Chap. II, sec. 9) that glottalization with sonorants derived from absorption of an abutting glottal stop, whether underlying or arising from a lost vowel (through h, as shown). But it is clear that, once absorption has occurred, a directly physiological constraint is faced: voicing would obviously be lost in the presence of total glottal constriction, and it is suggested that the laryngealization found in these cases is the contextually-determined output for (absorbed) glottalization.⁵

It is interesting to note that an alternative development could have arisen in the case of glottalized w,y; a change of sonorance to obstruence could have resulted (compare 'The Trend to Obstruence,' Chap. IV, sec. 3.8.2),

¹Cf. Chomsky-Halle (1968), p. 315.

²See 'Manner,' for the distinction between stops and affricates (Chap. IV, sec. 4.2).

³For release characteristics, see 'Manner' (Chap. IV, sec. 4.2).

⁴As indicated above (Chap. IV, sec. 2.3), I include l among the non-syllabics.

⁵Thus the statement 'in sounds produced with glottal constriction voicing can occur only after the glottal constriction has been released' (SPE, p. 315) must be modified to 'in sounds produced with total glottal constriction . . .'

with g^w and j as output. Instead, allophony of glottalization occurs.

IV.3.9.2. \dot{l} , \dot{w} , \dot{y} : but b , d

It is also feasible to extend the account given for the variants of glottalization, to cover the problem of the loss of (absorbed) glottalization in the case of b, d discussed in the text (Chap. II, sec. 9). With the change of obstruence, accompanied as it is by a switch to non-spontaneous voicing, the vocal cords are probably more open than they are in the speech-ready stance. Assume that the (primary) command for glottalization in (e.g.) $*\dot{m}$ is switched to laryngealization (i.e., partial constriction); then, with the change to \dot{b} , it is clear that a further modification must occur, for the fresh command (for non-spontaneous voice-adjustment) is now contradicted by that of laryngealization. For Twana this incompatibility is resolved in favor of continued voicing,¹ and the glottal constriction is eliminated altogether.²

¹This has protected the contrast with the voiceless (glottalized) stops, with which such segments would otherwise have fallen together. I do not know whether the other alternative (unvoicing) has occurred in any Salish language.

²The assumption here, that laryngealization and non-spontaneous voice are incompatible, of course rests entirely on the assumption that non-spontaneous voice requires the cord-adjustment mentioned. If non-spontaneous voice is maintained without cord-adjustment (e.g., by larynx-lowering), no incompatibility arises; such may be the case for (some African and Californian) languages showing laryngealized b and d , often in free variation with (or accompanied by) the implosion we should then expect. Cf. Ladefoged (1968), p. 16.

IV.3.10. Twana Distribution of Cavity Features¹

	p	t̥	c̥	ʔ	ʔ̥	k̥	q̥	ʔ
	p	t̥	c̥	-	ʔ̥	k̥	q̥	-
	-	-	s	t̥	ʔ̥	(x)	x̥	h
	b	d	ʒ	-	ʔ̥	g	-	-
	m	n						
	w	-	-	l	y			
Anterior	+	+	+	+	-	-	-	-
Coronal	-	+	+	+	-	-	-	-
High	-	-	-	-	+	+	-	-
Low	-	-	-	-	-	-	-	+
Back	-	-	-	-	-	+	+	+
Round	+	-	-	-	-	+	+	-
Secondary Apert.	m	n	-	+	-	-	-	-
ʔ constriction	{ voiceless obstruents = + 'Full' (ʔ = +) Non-syllabic sonorants ² = + 'half' [→ Laryngealization] voiced obstruents = ∅							

Fig. 64.--Cavity Features (matrix)

¹For Vowels, see Chap. IV, sec. 3.3.2 (p. 185).²Glottalized non-syllabic sonorants (perhaps only) arise through glottal absorption, hence not in dictionary entries.IV.4. Manner Features

The manner features of relevance to Twana phonology are those labelled Continuant, Release, Supplementary Movement, and Tense in SPE.

IV 4.1. Continuant

Of the non-Sonorant Consonants, those articulated with constricted but not blocked air-flow are characterized as Continuant. In Twana, Continuants contrast with stops at all stop-articulation positions, except that there are no Continuants matching either p, t, or non-Rounded k.¹ Thus, s, ʃ, ʂ, x^w, ɣ, and x^w.

Degrees of frication must be assigned to the output for (e.g.) x^w as against x^w. The post-velar continuant x^(w) is heavily fricated, while the velar continuant x^w is very frequently hardly to be distinguished perceptually from hw: in fast speech (see text and notes to Tale), the continuant element here behaves like the (weak) h, and is lost, leaving w.

One problem arises concerning ʃ. While the medial cluster ʃ + Nasal² is what we have called (see Chap. II, sec. 20) a 'compatible' cluster, medial ʃ + Nasal develops a linking (syllabic) ʃ̣. Compare ʃáwáʃbəʃ 'Indian' with séʃbəd 'half brother.' It is not quite clear how one ought to motivate the rule for syllabic ʃ̣: no other non-Sonorant Continuant shows such behavior, although the voiced Sonorants show a parallel characteristic in the insertion of shwa (Chap. II, sec. 20).

There are four alternations involving continuants. First, the suggested (and problematic) rule for development of palatal ʃ̣ from *x, beside ʃ̣ from *k (Chap. IV, sec. 3.5). Second, the positional assimilation of s to following ʃ̣/ʃ̣ (Chap. IV, sec. 3.4). Third, the alternation ʃ̣ ~ ʃ̣ in certain forms (Chap. IV, sec. 3.5).

The fourth, the development of ʃ̣ from plain ʃ (Chap. II, sec. 15.9) presents a different kind of problem. It would be possible to hold that the ʃ → ʃ̣ rule constitutes evidence that ʃ is itself to be characterized as a Continuant. The facts of articulation are not, however, decisive: if ʃ is looked on as showing a stoppage at the primary constriction,³ then it is a stop, whereas if the incomplete nature of the blockage is emphasized, then it is a continuant.

¹The segment x remains problematic. ²See fn. 1, p. 213.

³That is, total oral median constriction. It is not clear by what criterion of hierarchy SPE makes 'Secondary aperture' a Cavity, rather than a Manner feature. If Manner, the feature might well be a feature of Release.

The treatment of l so far in this thesis has concerned its behavior under glottalization, viz., that it behaves in parallel fashion to the rest of the sonorants. The motivation in the $l \rightarrow \text{ɫ}$ rule for calling it a continuant lies largely in the difficulty we should otherwise have in specifying the strongly fricative nature of the output ɫ . On the other hand, the degree of friction could perhaps as easily be specified in terms of the following h which is the direct cause of the loss of voice. It is thus quite feasible to maintain the Sonorant nature of l , providing for the fricative nature of the non-Sonorant (so-called 'h-unvoicing') by rule.

Conversely, the non-Sonorant ɫ will acquire its off-glide l before a nasal in two stages:

1. $\emptyset \rightarrow \begin{bmatrix} +\text{Lat} \\ +\text{Son} \end{bmatrix}$ in env. / $\# \left[\right] \text{ɫ} - N \left[\right] \#$ ¹
2. $\text{ɫ} l N \rightarrow \begin{bmatrix} 1 \end{bmatrix} \begin{bmatrix} 2 \\ +\text{Syll} \end{bmatrix} \begin{bmatrix} 3 \end{bmatrix}$
 $1 \ 2 \ 3$

IV.4.2. Instantaneous Release and Twana Affricates

Since affricates may contrast for stridency,² a further feature is clearly required to distinguish plain from affricated stops: SPE suggests that the release characteristic³ $[+\text{Instantaneous}]$ be used to characterize plain stops. For Twana, distinctive affrication is found only in $\text{t}^{(n)}/\text{t}^{(n)}/\text{d}$ contrasting with $\text{t}^{(n)}/\text{d}$, both being otherwise $[+\text{Cor}, +\text{Ant}]$ so far as articulation-position (Cavity) features are concerned.

However, several Twana segment-types are non-distinctively affricated,

¹At Chap. II, sec. 20.3 it was assumed that voiced stops were involved: but it was then shown (Chap. II, sec. 20.5) that the relevant segments were still Nasals at the point of application of this rule.

²Chomsky-Halle (1968), p. 329.

³It is quite unclear what importance is to be attached to the taxonomy of the features under cover terms such as 'Manner,' as here, as against 'Source' as with Stridency. This being so, it is not considered worthwhile at this point to seek implications of the removal of the present phenomena from the 'Source' to the 'Manner' features.

either always or in free variation with non-affrication. The segment types ʃ and ʒ/ʝ are always affricated,¹ although neither contrasts with a non-affricated stop at the same position of articulation. Likewise, affrication is often found with the glottalized varieties of the post-velar q , i.e., q and q^w : it is often the case, particularly with Labialized q^w , that the perceptual distinction between $k^{(w)}$ and $q^{(w)}$ leans heavily on the affrication of q^w .²

I have not seriously considered the possibility of assuming that the release feature [Instantaneous] might in fact constitute the distinguishing difference between k (etc.) and q (etc.); for the non-glottalized $k^{(w)}-q^{(w)}$, distinction is never carried perceptually by affrication.³

The time-lapse between release of the oral closure and the occurrence of voice-onset in a following vowel depends on a number of interlocking parameters, e.g., position of vocal-cords, tenseness of tract, P.⁴ s.g. This time-lapse is often called aspiration. For non-glottalized segments with [+Instantaneous release], the times for Twana correspond roughly to those given for American English,⁵ ranging from 30-100 msec over p to q ,⁶ the value increasing with distance from the lips. Final stops are optionally unreleased.

In sum, Twana plain stops are moderately aspirated initially and medially, and optionally unreleased finally.

¹The lateral very heavily so.

²Of course, this is at least in part a criticism of the field-worker's ear. Without synthesis experiments, it is impossible to be clear on the role played by affrication in such a case, so far as the native speaker is concerned. It is nevertheless evident to me that glottalization often masks the degree of the feature [High].

³An alternative explanation of 'intrusive h' (see pp. 26, 98, 99 and fn. 2, p. 99) is that it is precisely this affrication which has been (historically) re-evaluated as h, with resultant metathesis (see C-h metathesis, Chap. II, sec. 15.7).

⁴But see also 'Supplementary Movement,' Chap. IV, sec. 4.4.3; see Kim (1967).

⁵Peterson and Lehiste (1960) give a range from 58-75 msec for initial stops, and point out (although they do not explain) the almost elementary relationship with 'place of articulation.'

⁶Initial or intervocalic. No aspiration is found in the environment /#s-.

IV.4.3.--Supplementary Movements: Oral Pressure and Twana Glottalization

Were it the case that the onset-timing of voicing in a vowel depended solely on the position of the cords at the time of release, then the voicing delay after glottalized stops would remain unexplained, for the cords are in fact tightly adducted for such stops.

However, as was pointed out above, other factors are also in play. The relaxation of the cords after tight adduction is one factor, although not commented upon in the literature. A second is the relative timing of the oral and glottal releases; in Twana, the glottal release is only very slightly delayed after the oral release.

The most important factor, widely commented upon,¹ is the raising of the glottis (probably, of the whole larynx) during the oral closure of a glottalized stop, which increases the pressure in the oral chamber. The time taken for the pressure in the oral chamber to fall sufficiently for the Bernoulli effect to obtain across the relaxing glottis, is at least equal to (and may even exceed) the parallel time taken for the cords to approximate in the case of plain stops.

For Twana, preliminary indications are that voice-onset time is indeed (on the whole) longer² for the glottalized stops than for their plain counterparts. However, place of articulation seems to introduce complications,³ for there is inconsistency among the velar and post-velar stops.

Since force of release is dependent on oral pressure at the time of release, we must also postulate degrees of raising of the larynx, since we find positional variations in this parameter. Initial and intervocalic glottalized stops are usually fortis. Finally, they are weaker however, a fact that may be related to the distribution of stress over the phonological word.

¹E.g., in Ladefoged (1964), Kim (1967), Chomsky-Halle (1968), p. 323.

²An expected result, insofar as the relative masses of the larynx and the vocal cords are concerned.

³Compare the k-allophones, and the apparent contradiction of the 'place of articulation' explanation of aspiration-time in Peterson-Lehiste (1960). It may be that the larynx does not need to travel so far to create the excess pressure required, in the case of velar articulations.

Glottalized stops are weak in force of release when non-final in a cluster, with following non-glottalized consonant.

Thus, three degrees of larynx-raising are probably required for Twana, although all are contextually determined. It is also clear from the above discussion that an automatic rule must apply, at the point of the glottal-stop allophony rules for resonants, to reverse the sign of the [larynx raised] feature (normally 'plus' for segments [+Glottal constriction]) to 'minus.'¹

IV.4.4. Tense-Lax

IV.4.4.1. Introduction

Despite rebuttals, doubts and reservations,² there seems to be strong empirical, as well as theoretical support for the feature Tense. Since we have accepted the notion that segments are to be fully specified as they enter the phonological component of the grammar, we must assign a value to this feature too, for each segment: more interesting, however, is the question whether this feature is used distinctively in Twana, i.e., whether any of the rule-dictated behavior of segments requires (or is made more plausible by)

¹ Larynx-raising and larynx-lowering are not the two poles of a single feature, but rather quite separate Features; the minus value for both corresponds to the neutral tract position of the larynx (i.e., slightly raised).

Note: It may well be the case that it is not always necessary to specify values for all the (Universal) Features in each dictionary segment: some features apply to whole words, or even utterances, and the value of others is automatically subsumed under the definition of the speech-neutral tract stance. The present feature [Larynx raised], seems to fall into both these categories.

² A typical rebuttal is that of Lisker-Abramson (1964). For sample doubts, see Jones (1959); while for reservations, see Ladefoged (1964). For theoretical justification, see (e.g.) Jakobson-Halle (1963), and Chomsky-Halle (1968). Kim (1965) has a good survey, and offers confirmation from energy-distribution, wave-form, oral-pressure and air-flow measurements, palatography and electromyography, using Korean data. For x-ray cinematographic support see Perkell (1965).

the use of Tenseness. For Twana stop consonants and vowels, there does seem some justification for the use of this feature.

Physiologically, [Tense] corresponds to an over-all tension in the larynx (extrinsic as well as intrinsic musculature?), vocal-tract walls, and tongue.¹ The results of this tension are said to be seen in consonants as quicker closure and release, longer closure, greater area of closure-contact, and greater intensity of plosion on release.² For vowels, the concomitants of tenseness are supposedly greater divergence from the speech-ready position of the tongue, greater precision of tongue position and correspondingly lesser co-articulation with abutting consonants, as well as greater duration.

IV.4.4.2. Tense-Lax in Twana Vowels

IV.4.4.2.1. Gross Considerations

It is of interest that Twana, like many Salish languages, makes a somewhat irregular use of the articulatory space available.³ Thus, its high vowels are in detail higher-mid,⁴ the highest allophones of any vowel are two allophones of shwa which are lower-high, the low front and low back rounded vowels are in detail lower-mid, while only the low unrounded back vowel is truly low.

However, gross considerations of 'most common allophones' in an articulatory space-pattern are quite insufficient as a basis for deciding whether

¹There seems no experimental evidence to decide whether this is a single phenomenon or not: assuming that it is, is its status merely that of Manner?

²It is not clear just how Tense is related to 'Heightened sub-glottal pressure,' so far as voiceless obstruents are concerned.

³Compare the unusually 'crowded' articulatory spacing of consonants at the back of the oral chamber, as against the lack of a spirant at the labial or dental positions. Compare the even more extreme case of some Inland Salish languages in Kinkade (1967). For Nootka, see Jacobsen (1968).

⁴The phonetic descriptions here accord with Smith-Trager (1957).

there is a Tense-Lax distinction present. Consideration must also be given to the possibility that the vowel most closely approaching the articulatory position of the speech-ready tongue is Lax, in rule-behavior and/or phonetic realization.

But we are not in a position to label the relevant vowel, e^1 (or any Twana vowel, for that matter) as Lax before considering the details of co-articulation.

IV.4.4.2.2. Co-articulation

(a) e, a, o, Stressed and Unstressed

e Stressed

Initial(?)¹

[e·]	ʔélad	ʔébəc	ʔéwad	ʔésp ^w xəb
	eat	grandchild	invite	smoking(of tobacco)

Medial

[e·]	a) péstab	čét	yabéd	šédalʔče
	everything	near	fruit	woman-chaser
[e·ə]	b) tabé ^ə x ^w		ʔaščé ^ə x	ʔabé ^ə lʔ sé ^ə l
	earth		cold	if cloth

Final (?)¹

e Unstressed

Initial(?)

[e]	ʔesə ^ə ʔ	ʔelsəq	ʔes ^w káš	ʔelál
	your	split	throw	weep

Medial

[e]	a) ɬeʔéɬ	bəheʔú čəd	ʔateččé	q ^w ʔq ^w u belʔə čs
	yonder	I'm coming	now	egg
[e ^ə]	b) če ^ə x-ócad	be ^ə q ^w ʔ		
	it's cold	drink		

Final(?)

[i]	a) ʔəsále	q ^w əl·áde	čəqpe	tqáče	sq ^w əbáʔe ɬ sq ^w əbáyʔ]
	two	ear	fir tree	eight	dog
[e ^ə]	b) ʔəsále ^ə q ^w ést				
	two cows				

¹The possible relevance of the notion of speech-ready tongue stance to the behavior of e is considered later (see treatment of h, in 'Tense-Lax in consonants'). Shwa is the vowel implicated as Lax, as is shown in later sections.

a StressedInitial(?)

[a.]	ʔáɸ	ʔáɪ	ʔáxcəd
	wipe	fast	bed

Medial

[a.]	sááʔ	ɪáwalbəs	páʔaq ^w	stáb
	ice	Indian	pipe	what ?
[a.]~[á.]	q ^w áʔ	x ^w áɪtəb	k ^w ábəlax ^w	ʔesk ^w ás
	far	Causasian	cedar-root	throw

Final

a UnstressedInitial(?)

[a]	ʔastáb	ʔabélʔ	ʔaxéc	ʔapóstəd
	blunt	if	go to bed	towel

Medial

[a]	ččáʔayac	čəʔxócəd	ʔastépalčəd	ʔəlálčəd
	boy	cold weather	I'm afraid	I'm singing
[a]~[á]	ɪáwalbəs	šəx ^w ab	s ^ʔ áq ^w	
	person	wind	snow	

Final (?)

baqáʔa

Makah

o StressedInitial(?)

[o.]	ʔópədəəs	ʔóbətəbəs	ʔólax	ʔóq ^w st
	ten	bumming for food	gather	beat

Medial

[o.]	šóʔ	bósas	ʔaspóc	ʔas-sótčəd	ʔashóy
	grind	four	float	I know	done
[u.]	dəšóyay	dók ^w ebaɪ			
	wolf	Dukwebaɪ			

Final(?)

o UnstressedInitial(?)

[o]	ʔ ^o óšəbəc	ʔopái	ʔocáwal	ʔosél
	please	eat	embark	dive

Medial

[o]	q ^w o ^x ód	ʔ ^o óód	dəsʔ obát	čádóšəd
	hide it!	knot it!	my name	three times
[u]	došóyay	toʔiáwalbəš		
	wolf	Indians		

Final(?)

[o]	qáqto	q ^w élo	shábo	spáčo
	cradle	inner bark	story	berry-basket

(b) Stressed1. With preceding non-labialized stop

<u>Pre-stress</u>	<u>Stressed [ʌ] ~ [a]</u>	<u>Post-stress</u>	<u>Gloss</u>
p, p̥	sə də x ^w -pát	t	shirt (wrap)
	pəc	č	defecate
	pəq	q	white
	pəɬ	ɬ	thick
	pəlʔ-pəɬac	l	capsize (Augmented)
t, t̥	ʔas-təb	b	blunt
	s-təcəd	č	slave
	s-təq	q	log jam
	təsad	s	hit him
	təlʔbəš	lʔ	take off
ʔ ^(c) , c	čəp	p̥	ambush
	čəd	d	shake
	čəq	q	drip
	čəs	š	elder sister
	čəlab	l	lungs

Stressed [ʌ] ~ [a]

ʔ	s-ʔəqɬ	q	wing
	ʔəx	x	be midwife
	ʔəlʔ-ʔəlay	l	shovel-nose canoes (Augment)

<u>Pre-stress</u>	<u>Stressed [ʌ]~[a]</u>	<u>Post-stress</u>	<u>Gloss</u>
(ʔ) (ʔ) k, q	qəb	b	smooth
	qəč	č	weave
	kəs	s	urinate
	qəs	s	scratch
	qəɬ	ɬ	possible
	qəx	x	do something taboo
	qəlʔ-qəlab	l	bad (Augment)
ʔ	ʔəbatəbəd	b	seat
	be-ʔəxad	x	clear the throat

2. With preceding labialized stop or spirant

	<u>Stressed [ɔʷ]</u>		
k ^w	ʔas-k ^w ədad	d	hold
	k ^w t-k ^w ətəbəc	t	husbands (Augmented)
k ^w	k ^w əčade(h)	č	rabbit
	ʔas-k ^w əs	s	count
	s-k ^w əspɬ	s	trout
q ^w	s-q ^w əs.əb	s	fog
q ^w	ʔəs-q ^w t-q ^w ətəx ^w	t	thin (Augmented)
	ʔas-q ^w ət	t	fire
	ʔəs-q ^w s-q ^w əso	s	strung (Augmented)
	q ^w əx ^w če(h)	x ^w	finger-nail
	q ^w əlʔ-q ^w əlde(h)	l	ears (Augmented)
	q ^w əl	l	cooked
x ^w	s-px ^w əb	b	smoke
	ʔas-x ^w əd	d	tired
	čx ^w əs	s	five
	x ^w ət	ɬ	hard
	x ^w əltəb	l	Caucasian
x ^w	x ^w əl	l	nine
	s-x ^w əde	d	bull-head

3. With preceding voiced stop or nasal

	<u>Stressed [á]~[Á]</u>		
b	bədə(h) [á]~[Á]	d	child
	bətəb "	t	murdered

Pre-stress	Stressed [á]~[Á]~[ə]	Post-stress	Gloss
b	bə́day [á]~[Á]	ɛ	snake
	ʔas-bə́ɪ "	ɪ	sated
	bə́leʔas [ə]	l	raccoon
	bə́yaɪ [á]~[Á]	y	start
	bə́yac "	y	meat
bʔ	ʔasəbʔə́s [ə]	s	cave
d	ʔas-də́ɛ [á]~[Á]	ɛ	pressed
	sə-də́x "	x	conversation
	də́lal "	l	stopped
	sə-də́ʔwat "	ʔw	surf
m	ʔas-mə́xʔ "	xʔ	proud
	tə́mə́qʷas "	qʷ	motor-car
	mə́ʔə (h) "	ʔ	dad
m	ɛəmʔə́xʷ-qs "	xʷ	pointed-nose
	mə́mʔə́s [ə]	s	thin
n	---		

4. With preceding continuant

	Stressed [Á]~[á]		
s, sʷ	sə́p-qʷad	p	beat
	ʔas-sə́tad	t	standing
	ʔas-sə́q	q	split
ɪ	ɪə́p-ap	p	fall
	ɪə́ɛ	ɛ	sharp
	ɪə́q	q	wide
x, h	xə́d-xə́daqʷ	d	lame
	xə́ɛ	ɛ	measure
	xə́xʔ	xʔ	bite
	xə́q	q	land
	xə́ɪ	ɪ	angry
	xə́lʔ	lʔ	mark
	ʔas-lə́-hə́leɪ	ɪ	we're alive (Augmented)

Pre-stress	Stressed [ʌ] ~ [á]	Post-stress	Gloss
l, ʔl	l ^ʔ á	ʔ	bundle, tie up
	l ^ʔ á	á	feel over
	ʔl ^ʔ x	x	light
	l ^ʔ áw ^ʔ	w ^ʔ	go into (non-animate)
	ʔas-l ^ʔ áwado	w	baked
y, ʔy	yáb-ʔy ^ʔ ábat	b	tied round (Augmented)
	yáð-ʔy ^ʔ ádas	d	teeth (Augmented)
	yá ^ʔ t	t	roll
	ʔy ^ʔ á ^ʔ x	ʔ	scrounge, bum
	y ^ʔ á ^ʔ q ^w	q ^w	wash
	y ^ʔ á ^ʔ q	q	file
	še-ʔy ^ʔ á ^ʔ sad	s	legs (Augmented)
	y ^ʔ á ^ʔ x	x	sort out
	y ^ʔ á ^ʔ x ^w ax ^w	x ^w	disappear
	yál ^ʔ -y ^ʔ á ^ʔ lax	l	gather (Augmented)
w, ʔw	ʔw ^ʔ á ^ʔ d	d	down
	wáð-ʔw ^ʔ á ^ʔ daw	d	horns (Augmented)
	ʔw ^ʔ á ^ʔ cal	c	swim
	qá-w ^ʔ á ^ʔ qab	q	boxes (Augmented)
	ʔas-ʔw ^ʔ á ^ʔ x	x	dry
	tá-ʔw ^ʔ á ^ʔ lak ^w	t	crazy (Augmented)
	wál ^ʔ -w ^ʔ á ^ʔ lap	l	you all (Augmented)

5. With following w, or labialized obstruent

	Stressed [ʌ] ~ [á]		
l	ʔas-l ^ʔ áw	w	baked
p	ʔas-p ^ʔ á ^ʔ k ^w	k ^w	spotted
t	ʔas-t ^ʔ á ^ʔ k ^w		pierced
s	ʔas-ps ^ʔ á ^ʔ k ^w		broken
t	pt ^ʔ á ^ʔ q ^w -q ^w áð	q ^w	bandana
t	t ^ʔ á ^ʔ q ^w		lap, lick
l ^ʔ	pól ^ʔ á ^ʔ q ^w		gravel-cook
t	x ^w -t ^ʔ á ^ʔ x ^w was	x ^w	enemies (Augmented)
k	tk ^ʔ á ^ʔ x ^w		slap
s	sá ^ʔ x ^w -táð		grease

Pre-Stress	Stressed [ʌ] ~ [á]	Post-stress	Gloss
ʃ	ʃə́x ^w ab	x ^w	wind
bʔ	təb ^ʔ ə́x ^w	x ^w	gooseberry
t	ʔəs-ə́q ^w tə́x ^w		thin
l	q ^w alə́x ^w		cliff
ʔ	ʔəs-lə́w ^ʔ	w ^ʔ	shelled clams
l	ʔəs-lə́w ^ʔ		put in
y	yə́w ^ʔ		cure
b	ʔəs-xə́bə́k ^w	k ^w	tight
c	cə́k ^w		angle-worm
ʔ	ʔəsə-wə́lə́k ^w		crazy
y	yə́k ^w		pull out
b	bə́q ^w ab	q ^w	hay
č	čə́q ^w -šəd		sawbill
ʔ	s-lə́q ^w -qs		nostril
l	x ^w ə́lə́q ^w		hot
y	ʔəs-yə́q ^w		washed
w	q ^w ə-wə́q ^w atəb		drifted (Augment)

(c) ə Unstressed

1. In unaugmented forms

Unstressed [V] in Unaugmented	Cf. Augmented /ə/	Gloss
[v] wə́qə́b	qə́wə́qə́b	box
wə́dāw	wəd ^ʔ wə́dāw	horn
wə́ləp	wəl ^ʔ wə́ləp	you
q ^w ə́l.áde(h)	q ^w ə́l ^ʔ q ^w ə́lde(h)	ear
q ^w ə́l.ə́b	q ^w ə́l ^ʔ q ^w ə́ləb	sink
ʔə́š-čə́wə́x	ʔə́ščə́wə́x	dry
s-yə́wəs	syə́wə́s	wood
[ɪ] s-yə́lə́b	s-yə́lə́wə́b	year
s-yə́lə́wə́č	s-yə́lə́wə́č	cousin
yə́dəs	yə́də́s	tooth
yə́tə́wə́de	yə́tə́wə́de	salmon-berry bush
yə́šəd	šə́yə́šəd ~ šə́yə́šəd } ~ šə́yə́šəd }	leg

Unstressed [V]: in Unaugmented	Cf. Augmented /ə/	Gloss
[ʌ] ~ [a]		
ʔas-qəbāc	ʔas-qəbqəbāc	shrunk
qəwəʔāce	qəʔqəʔwāce	cane
ʔas-xədaq ^w če(h)	ʔas-xədxədaq ^w če(h) ~ ʔas-xətxədaq ^w če(h)	hurt hand
[ə]		
təbéx ^w	təbtəbax ^w	earth, land
cədəi	cədcədaɪ	he, she
ʔas-cəɪʔəs	ʔas-cəɪʔcəʔlas	rattled
bəqsəd	qəbqəsəd	nose
ʔas-wəɪlək ^w	ʔas-ləʔwəɪlək ^w	crazy
yəq ^w osadəx ^w	q ^w yəq ^w sadəx ^w	wash his face
ʔas-ələx ^w	ʔas-ləʔələx ^w	hunter

2. Replacing unstressed prefix (with corresponding CV- stem)

	Augmented	Unaugmented	Gloss
[ʊ]			
	wəc-ʔwəcal	ʔwəcal	swim
	k ^w əb-k ^w ābəlax ^w	k ^w ābəlax ^w	root
	ʔas-x ^w əd-x ^w əd	ʔas-x ^w əd	tired
[ɪ]			
	šəd -šədəq	šədəq	fly
	čəɪʔ-čəɪlaš	čəɪlaš	hand
	čəd-čəd	čəd	shake
	yəɪʔ-yəɪlaq ^w	yəɪlaq ^w	return
[ə]			
	bəd-bədə(h)	bədə(h)	child
	s-qəb-qəboɪ	s-qəboɪ	dug-out canoe
	qəɪʔ-qəɪway	qəɪwəyʔ	crippled
	bəɪ-bəɪle(h)	bəɪle(h)	spring (water)
	səɪʔ-səl	səl	cloth
	xəb-xəb	xəb	wrinkled

3. Replacing originally-stressed stem vowel, in presence of stressed (Atten.) prefix

	Attenuative	Stem	Stressed Vowel replaced	Gloss
[ʊ]				
	s-k ^w əʔe-k ^w ədəb	s-k ^w ədəb	e	chicken
	səʔā-sx ^w əb-čəd	səx ^w əb-čəd	a	I'm jumping
	x ^w əʔə-x ^w əbat	x ^w əʔəbat	o	paddle
	s-x ^w əʔe-x ^w ədə	s-x ^w ədə	ə	bull-head

	<u>Attenuative</u>	<u>Stem</u>	<u>Stressed Vowel Replaced</u>	<u>Gloss</u>
[ɔ]	k ^w áʔ-k ^w əbəlax ^w	k ^w ábəlax ^w	a	root
[ɪ]	šéʔe-šədaq	šedáq	e	fly
	čáʔa-čələš	čálaš	a	hand
[ʌ]~[a]	léʔe-ləq	léq	e	dig
	x ^w óʔo-x ^w əyəb	x ^w oyób	o	sell
	déʔe-dəx	dəx	ə	converse
[ə]	séʔe-səl	səl	e	cloth
	báʔa-bəle(h)	bále(h)	a	fish-roe
	šóʔo-šəʔəb	šoʔəb	o	grind
	be-péʔe-pəlʔče-čəd	be-pəlʔče-čəd	ə	overturn

4. Replacing unstressed stem-vowel, in presence of stressed
(Atten.) prefix

[ʊ]	ʔéʔe-səʔwac	ʔesáwac	a	chew
	wéʔeʔ-wəqəb	wəqəb	ə	box
	wéʔeʔ-wələk ^w	wələk ^w	ə	crazy
	s-téʔe-təq ^w əb	s-téq ^w ab	a	toy
	s-q ^w éʔe-q ^w əbe	s-q ^w əbáyʔ	ə	dog
	saʔá-sx ^w əb	sáx ^w ab	a	jump
	laʔá-ləwəlbəš	láwalbəš	a	Indian
[ɔ]	léʔe-l ^w k ^w əd	lék ^w ad	a	speak
[ɪ]	šéʔe-šədaq	šedáq	e	fly
	téʔe-tkeʔəs	tkáyas	a	basket
[ʌ]~[ə]	qéʔe-qələb	qələb	ə	bad
[ə]	x ^w óʔo-x ^w əbat	x ^w əbat	a	paddle
	s-k ^w əʔá-k ^w təd	s-k ^w átad	a	rat
	séʔe-sələd	sələd	a	food
	s-ʔéʔe-lətx ^w	s-ʔélatx ^w	a	timber
	čáʔa-čələš	čálaš	a	hand

(d) a Unstressed, with Prefixes1. With S-Nominal prefix

	<u>Nominalization</u>	<u>Gloss</u>
[ə] -b	sə-báded	mountain
	sə-báx̣ ṣx̣ ^w éx̣ ^{ay}	mountain-goat
[ə] -d	sə-də'wat	surf
	sə-dábapacqəd	hip
[u]~[ə] -w	sə-wá'we'əct	news
	sə-wáq̣ ^w səb	lightning
[v] -ʔw	sə-ʔwésab	flood
	sə-ʔwát	someone
[ə] -l	sə-ləp̣	blanket
	sə-lé' 1ʔk ^w əd	talk, language
[ɸ] -y	s-yəcəb	sermon
[ə] -b	sə-bolólq̣ ^w	ball
	sə-bə'óbat	names (Augment.)
[ə] -d	sə-debál	we two
	sə-do'qóʔ	river
[ɸ] -n	s-nənəkéya(h)	diving duck
[v]~[ə] -w	sə-waqéq̣	frog
	sə-wəlálq̣ ^w ot	broad-leaf cat-tail
[ə] -l	sə-lə'élal	songs (Augment.)
	sə-lə'ólaxə'əd	dishes (Augment.)
[ɪ]~[ɸ] -y	sə-yə'wés ~ s-e'wés ~ s-ew'és ~ s-ɪv'wés sə-yələb ~ s-yələb }	wood year

2. With ʔas- Stative prefix

	<u>Stative</u>	
[ə]~[ɸ]-b	ʔasə-béx ^w səb ~ ʔas-béx ^w səb }	smiling
	ʔas-bə'ɪ	sated
[ɸ] -m	ʔas-mə'x̣	proud

	<u>Stative</u>	<u>Gloss</u>
[ə] -d	ʔasə-dəʔ	rotten
	ʔasə-décʔ	grazed (bruised)
[ə] -w	ʔasə-wáq	hurt
[u] ʔw	ʔasə-ʔwáx	clear (weather)
[Ø] -l	ʔas-láw	bright
	ʔas-láq	bought
[Ø] -ʔy	ʔas-ʔyáx	sorted
	ʔas-ʔyáx	melted
[ə] -b	ʔasə-bolʔóq ^w	tangled
	ʔasə-bətáb	warm (weather)
[ə] -d	ʔasə-dəʔáíq ^w	rotten-smelling
	ʔasə-dəčəqs	flat-nosed
[ə] -w	ʔasə-wəlék ^w	crazy
	ʔasə-wəféwad	invited (Augment.)
[Ø] -l	ʔas-ləʔélaí	sung (Augment.)
	ʔas-ləléleí	we're alive (Augment.)
[Ø] -y	ʔas-yəbəq	caught
	ʔas-yəléx	gathered

3. With single-segment prefix (Augment. or Atten.) after cluster-simplification for stems--Voiced C+V+Voiceless C

	<u>Augmented</u>	<u>Unaugmented</u>	<u>Gloss</u>
[ʌ]~[a]	qə-bəqsəd	bəqsəd	nose
	qə-báq ^w ab ²	báq ^w ab	field
	qə-bəq ^w ab ²	bəq ^w ab	shocked (hay)
	qə-láq	láq	bought
	qə-wəqáb	wəqáb	box
	q ^w ə-wəq ^w ə'təb	wəq ^w ə'təb	drifted
	qə-yəqəsədax ^w	yəqəsədax ^w	file
	q ^w ə-yəq ^w əčə	yəq ^w əčə	wash hand
	q ^w ə-yóq ^w əyab	yóq ^w əyadax ^w	rotten
	ʔas-xə-báx	ʔas-báx	worn out
	xə-lʔəx	lʔəx	lamp
	xə-ʔyáx	ʔyáx	melt
	ʔas-x ^w ə-ʔyáx ^w	ʔas-ʔyáx ^w	disappear

	Augmented	Unaugmented	Gloss
[I]	ʔəḥ-ḥəʔyáḥḥədəb } ~ʔəḥ-ḥeʔáḥḥədəb }	ʔasa-ʔyáḥḥədəb	carry on back
[ə]	ʔəs-iaʔwáḥak ^w	ʔasa-wáḥak ^w	crazy
	dəx ^w -tə-bótəbəd	dəx ^w -bótəbəd	breast
	ʔas-məʔ ^ʔ	ʔas-ḥə-məʔ ^ʔ	proud
	ʔəḥ-ḥə-déc ^ʔ	ʔasa-déc ^ʔ	grazed
	ʔas-pə-lépəḥ	ʔas-lepéḥ	covered

Fig. 65.--Co-articulation of Vowels

¹ It is unlikely that vowels occur either initially or finally in dictionary entries (i.e., underlying forms), 'Initially' thus corresponds to 'after initial?' 'Finally,' on the other hand, as shown in Chap. II above, a variety of origins are possible. Thus (e.g.) $\dot{q}^w\dot{a}l\dot{a}de$ could come from $*\dot{q}^w\dot{a}l\dot{a}deh$, $*\dot{q}^w\dot{a}l\dot{a}dey$, or even $*\dot{q}^w\dot{a}l\dot{a}deyh$ (ignoring here the problem of [-l.-]) Parallel sources for 'final' [ə] would be *-oh, w, or wh.

² Perhaps an option in the semi-vowel rule.

The contextual (co-articulation) variants of vowels may be considered as the products of target-seeking commands and the constraints imposed by prior and/or future target-seeking commands. Depending on the particular set of commands used in the rules and the segments, certain command parameters (integer-values of Distinctive Features) may for a particular segment be free to assimilate, partly or entirely, to those of a neighboring segment.

For Twana, the following co-articulations occur in stressed vowels.¹

1. e optionally develops a shwa offglide before [+back] consonants. Final before h, e has an allophone between lower-high [ɪ] and high [i].
2. o co-articulates for [+High] in the double environment $\text{ʔ} - y$, giving [u].
3. a co-articulates slightly and only for rounding, and only with a preceding consonant.
4. ə co-articulates strongly for rounding, again only with a preceding consonant. The 'remainder' allophone of ə is [á] while the (rare) allophone [ǎ] is not well understood.

¹ Consult Fig. 65 (a) and (b) for examples.

5. As is shown above, co-articulation concerns the features Round, High (and perhaps Low/Back); moreover, rounding affects only [+Back] vowels, and palatalization only [-Back] vowels. The

[+Low] vowel ɔ^* is thus affected only vacuously by the rounding rule, while the [+Low] vowel e^* is not affected by either rounding or palatalization.

The following co-articulations occur in unstressed vowels.¹

1. e has an optional a -like offglide before [+Back] consonants, as when stressed.
2. o again co-articulates for [+High], in the rare double environment $\text{d-}\text{ʃ}$.²
3. a again co-articulates for Rounding, again only with a preceding consonant.
4. ə co-articulates strongly for preceding rounding and palatality (High).³ The 'remainder' allophone is $[\text{ə}] \sim [\text{a}]$.⁴

Note that the rounded and palatalized variants of shwa have higher points of articulation than the 'main' allophones of o and e , respectively. This is an interesting aspect, so far as the Twana vowels are concerned, of the 'use of the articulatory space' commented upon above (Chap. IV, secs. 3.3.2 and 4.4.2.1).

5. e^* and ɔ^* are, again, not affected by either rounding or palatality.

From the point of view of co-articulation, Twana shwa certainly behaves as if it were inherently more vulnerable to the influence of neighboring segments than the other vowels. This accords well with the converse notion that shwa is minimally precise and distinct, i.e., may be tentatively characterized as Lax.

¹See Fig. 65 (a), (b), (c).

²But not $\text{t-}\text{ʃ}$. The case is excessively rare; were it supported by other examples, it would constitute evidence for an allophony rule for shwa to be passed through before the change of obstruency, for the case of $\text{t-}\text{ʃ}$ suggests that the d concerned is (at the point of operation of the rule) still a nasal (n).

³See Chap. IV, sec. 3.4 for rule-shape.

⁴Which seems (though not consistently) to be due to the influence of a velar, giving a 'lowering' effect.

IV.4.4.2.3. Length

Although individual factors making for differences in vowel-length have been widely discussed in descriptions of particular languages,¹ there is as yet little consensus concerning the exact inter-relations of these factors in a general theoretical framework. There is, in particular, no fundamental experimental evidence on which to base the notion of 'basic' length, an essential starting point in the process of calculating the quantitative effect of one factor or another.

There are at least two different possibilities for choosing the 'basic' length: we may assume that there is a basic shortest (or longest) length, with various lengthening (or shortening) factors; or, we may assume that there is a (median) basic length which is shortened by some factors but lengthened by others.

Two kinds of influence on such a 'basic' length (of whichever kind), must be recognized. There are segment-internal ('intrinsic') factors such as Tense-Lax, Height, and Backness; and there are contextual ('extrinsic') factors such as stress, type and position of syllable, and nature of abutting segments. Note that for each factor, the ambiguity remains that we are unsure whether to assign a lengthening or a shortening rule or both.²

Assuming that the basic length is the shortest vowel, then lengthening rules (and combinations of them) would apply to stressed, open, or final syllables; to Low, Back, or Tense vowels; and to vowels before voiced obstruents, nasals, and spirants.

For Twana, a small sampling³ has been made, from which the following findings are tentatively offered (Fig. 66).

¹E.g., Peterson-Lehiste (1960) for English, Elert (1964) for Swedish, Delattre (1939) for French.

²While the work of Kozhevnikov-Chistovich (1965) (e.g.) suggests a lengthening rule for V before voiced stops and nasals, Kim (1966) implies that both lengthening and shortening rules must apply, for voiced consonants and voiceless respectively. It is highly questionable whether this strategy should apply to such a factor as Tense-Lax, however; the 'basic' length should presumably be that of the Lax vowel.

³To be fully reported upon elsewhere.

Duration in msecs (averaged, all environments)					
	<u>ə</u>	<u>e</u>	<u>a</u>	<u>ɔ</u> [*]	<u>o</u>
Stressed	145	235	250	260	275
Unstressed	70	170	240	-	230
Proportion, stressed/ unstressed	2:1	4:3	20:19	-	9:7

Fig. 66.--Twana Vowel Duration

With results averaged over all environments, it is clear that the lengths of e-a-ɔ-o cluster as a group, as against the lower figure for shwa, for both stressed and unstressed vowels.¹ It is noteworthy that, however tentatively we must state this, the low vowel a is not longer than the vowels ɔ^{*}, o, as one might have expected on universal grounds.² this irregularity may well be attributable to the very strong degree of rounding in the Rounded vowels. Most marked, however, is the difference in the loss of length for unstressed shwa, as seen from the figures giving proportions.

These data, especially when taken together with those for co-articulation strongly suggest that shwa behaves differently from the rest of the Twana vowels in a manner characteristic of a Lax vowel.

IV 4.4.2.4. Rule Correlation

From considerations of the canonical shape of stems, constituent structure, and surface contrast, there is little doubt that, granted its Lax nature, shwa has equal status in underlying shapes with the other Twana vowels. Thus,

¹The divergence is much greater than that for English

	<u>ə</u>	<u>éɪ</u>	<u>á</u>	<u>ɔ</u>	<u>óu</u>	} Peterson-Lehiste(1960) Table 1, p. 702.
Cf. English,	181	200	265	250	222	

²We expect that, for a given degree of Backness, lower vowels will be longer; for Twana, length seems to correlate better with Roundness. Cf. the neutralization of k-k^h (etc.) before Rounded vowels (see Chap. IV, sec. 3.6).

those aspects of the behavior of shwa which distinguish it from the other vowels are likely to be explicable in terms of the same Laxness.¹

The rules which concern shwa primarily are those by which unstressed vowels are lost.² We may suppose that the process of vowel-loss proceeds in three stages:³ unstressed vowels revert to shwa, and shwa gives h, which in turn either alternates with [?] or is lost, in particular environments. Note that the motivation of an intermediate 'V to shwa' rule need not imply a reversion to some kind of 'neutral' vowel, a notion that becomes in any case difficult to maintain in the face of definitions of the speech-neutral tract such as that in SPE.

We may avoid the neutral-tract hypothesis and the difficulty attending it by assuming that certain unstressed vowels simply become [-Tense]. This is entirely consistent with the notion of a merger with shwa, since it is then only necessary to add a rule asserting that unstressed [-Tense] vowels lose voice, and thus also position of articulation.

A further indication of the weak (now, Lax) nature of shwa is that it is the only vowel to be lost in the immediately pretonic syllable of the stem.⁴ No special rule or condition in a rule need be employed to guarantee this, however; the major vowel-loss rule deals only with post-tonic vowels, and will make certain of these [-Tense]: all unstressed [-Tense] vowels will then lose voice, a rule that will also of course affect those (underlying) shwas in pretonic position. All voiceless syllabics will then lose Position.⁵

¹Implicit here is the assertion that all unstressed shwas of whatever source have the same allophones.

²Those rules connecting shwa with h, and where h is an environmental segment, are discussed under 'Tense-Lax in consonants,' in the following section (Chap. IV, sec. 4.4.3).

³And not two, as supposed in the Summaries of Rules so far.

⁴See Chap. II, sec. 3.3 for the motivation for losing all underlying shwas when unstressed, and replacing certain of them through the general shwa-insertion rule. See also Chap. II, sec. 11.

⁵It is not clear what status to assign to the cover-symbol [Position] (position of articulation), although its use seems clearly justified here.

The rules concerned (without their environments) are

1. $\begin{bmatrix} +\text{Syllabic} \\ -\text{Stress} \end{bmatrix} \longrightarrow [-\text{Tense}]$
2. $\begin{bmatrix} +\text{Syllabic} \\ -\text{Tense} \\ -\text{Stress} \end{bmatrix} \longrightarrow [-\text{Voice}]$
3. $\begin{bmatrix} +\text{Syllabic} \\ -\text{Voice} \end{bmatrix} \longrightarrow \begin{bmatrix} -\text{Syll.} \\ -\text{Pos.} \end{bmatrix}$

IV.4.4.3. In Consonants

IV.4.4.3.1. General

As has been shown, Twana b,d derive from nasals, with the concomitant specification [-Tense] automatic to segments which are spontaneously voiced. The change of obstruency can by no means be accompanied by a change of tenseness, since voice (which is precluded by tenseness) is retained. Output b,d are thus [-Tense].

So far as the voiceless stops are concerned, it is obvious that complete closure of the glottis requires tenseness¹ for the p series. On the other hand, it seems we must also postulate tenseness² for the plain p series, which shows moderate to strong aspiration, with neither allophonic voicing³ between vowels nor voice-assimilation.

IV.4.4.3.2. The Behavior of h/?

A number of the rules concerning h/? suggest that they are inherently weak consonants. They are lost in Attenuative reduplication,⁴ they allow

¹At least at the vocalis muscle. Cf. fn. 1 of Introduction to Tense-Lax, p. 217.

²As well as [-voice]. The dual criterion is: plausible rules, plus plausible output specification.

³Cf. Tillamook, as described in Thompson (1966). 'Plain obstruents t, c, ʧ, k, q, k^w, q^w are regularly partially or fully voiced in position before vowels.' For Tillamook, then, one might assume [-tense] stops. However, the fact that these stops are aspirated when voiceless obscures matters. The question will be taken up in another place.

⁴The loss of h, whether in reduplication or before a consonant, is

vowel-assimilation across them, and they metathesize towards the stress. We note particularly the relation between shwa and h as products of stresslessness in vowels, and that between h and ? both in their relation to stress and in their alternation in the neighborhood of non-syllabic sonorants.

The loss of h/? as first element in reduplication parallels the loss of voiced ([-Tense]) consonants as first element in cluster-resolution.¹ The possibility of vowel-assimilation across h/? , on the other hand, is to be attributed to the lack of an oral articulation for the latter, with the result that total co-articulation may occur, dominated of course by the stressed vowel. Note that vowel-assimilation does not occur across b,d, which are assumed to be [-Tense]: in turn, it is difficult to correlate glottal-metathesis (stress-attracted) with the feature Tense-Lax at all.

The hypothesis (Chap. IV, sec. 4.4.2.4) that h derives from unvoiced stressless Lax vowels which have lost 'position' is, however, altogether consistent with the characterization of h² as [-Tense].

It remains to reconcile this view of h as a Lax Sonorant with the functioning of certain other rules of Twana phonology. The rules concerned are those for laryngeal affection and those for the treatment of geminate vowels in the reduplication for the Attenuative.

So far as the rule for laryngeal affection of a,o is concerned, no special problem arises; these vowels simply assimilate in height to the [+Low] features of the laryngeal. However, the effect of h on shwa involves in addition a change of tenseness, for shwa becomes a.

Similarly, taking the rules for the behavior of geminate vowels before

in no way parallel to the sporadic loss of the spirant element of x^w in fast speech. Whether or not x^w is in any way to be considered as alternating with some kind of velarised labial, Tense does not seem to be implicated for the non-Low continuants.

¹It is thus worth considering whether the cluster-simplification referred to might not be better motivated by the use of [-Tense] in specifying the first segment. On the other hand, it does not seem feasible to collapse the rule for loss of initial h/? with that for cluster-resolution with initial b,d, since the former rule is much earlier than the latter.

²h → ? in /R/ is a Dissimilation--of [Tense], or [Cont]?

h, we see that while stressed shwa and geminate unstressed vowels (including shwa) behave in the same fashion before h, viz., they dissimilate to e, shwa must simultaneously become [+Tense].

At least two solutions are possible, for the motivation of the reversal of tenseness in shwa in these rules. We might allow the rules to generate [-Tense] segments corresponding to a and e (for the əhC and geminate-shwa situations respectively), adding a merger rule at a very late stage of the grammar; such a rule must precede the rules for assigning length to Tense and Lax vowels.¹ Alternatively, a re-examination of the rules themselves discloses the motivation required.

For the shwa-a rule, it is admittedly ad hoc to attribute the change of tenseness to the environment -hC. On the other hand, the behavior of geminate vowels before h may well be looked upon as a complete dissimilation. The vowels all give geminate /ee/; thus, the affected vowels are all [+Back], o is also [+Round], a is also [+Low], while shwa is also [-Tense]. Now where h is [+Low], [+Back], and [-Tense], all geminates may be said to undergo maximal dissimilation from h: thus, o, a, and shwa lose backness, o loses roundness, a gains height, while only shwa changes tenseness.

¹Equally ad hoc would be the device of assuming that geminate vowels are automatically [+Tense]. This, requiring an extra rule, is not only ad hoc but also less economical than the 'dissimilation' rule I at length assume. Any attempt to connect this shift to e for geminate vowels with the notion that e is the nearest Twana vowel to the speech-ready tongue stance seems foolhardy: not only is e not implicated in the general loss of vowels in any special way, but it is by no means established that the tongue position for 'speech-ready' is substantively a universal (but compare Chap. IV, sec. 3.3.1).

IV.4.5. Twana Distribution of Manner Features

	p̥	p	-	b	m	w	e	a	o	ə
	t̥	t	-	d	n					
	ʈ	c	s	ʒ	-					
	ʧ	-	ʈ	-	-	l				
	ʈ̥	č	š	ʝ	-	y				
	k̥(w)	k(w)	x(w)	g(w)	-					
	q̥(w)	q(w)	x̣(w)	-	-					
	ʔ	-	h	-	-					
Continuant	-	-	+	-	-	+	+	+	+	+
Inst. Release	[^(a) ʈ, ^(a) ʧ, ^(a) ʈ̥, ^(a) č, ^(a) ʧ̥, ^(a) ʧ̥̥]			[ʒ, ʝ, -]		+	+			
Raised larynx	+	-	-	-	* ¹	* ¹		-	-	-
Tense	+	+	[[?] h = -]		-	-	-	+	+	+

Fig. 67.--Manner Features (matrix)

¹Redundancy rule: 'If [+Glottal constriction], then [-Raised Larynx]. For segments m n w l y, [+Glottal Constriction] (probably) only occurs as result of glottal absorption, hence not in dictionary entries.

IV.5. Source Features

IV.5.1. Heightened Sub-Glottal Pressure

It is clear from the discussion in SPE referring to the voiced aspirated stops of languages like Hindi, that 'Heightened sub-glottal pressure' is to be considered a feature independent of Tense. It is not clear, on the other hand, whether Twana voiceless stops are to be considered to employ the former feature as well as the latter, even if redundantly.

Comparing degrees of aspiration for Twana voiceless stops and Korean

aspirated stops, for instance, there seems no reason to postulate [+Heightened s-g pressure] for Twana. Since there are no rules in the phonology of Twana that could conceivably employ this feature, it is difficult to see what further kinds of evidence could be brought to bear on the problem.

IV.5.2. Voice

The Twana segments for whose output specification it will be necessary to include [+Voice] are the voiced Sonorants (V,l,N) and the voiced obstruents b,d. As was pointed out in Chapter I, section 3, Voice is not distinctive in dictionary entries but must nevertheless be specified for all segments entering the grammar, for reasons rehearsed. Use was, moreover, made of this requirement: the environment "Resonant" in the rule for $h \rightarrow ?$ was to be simply specified, since the segments concerned are in fact the class of voiced consonants.

However, as was pointed out above (Tense-Lax and $h/?$, Chap. IV, sec.4.4.3.2) it is feasible to motivate the cluster-resolution rule (involving voiced consonants) as a parallel to the rule for $h/?$ -deletion in reduplication, by specifying the voiced consonants as [-Tense] rather than as [+Voice].

It is obvious that the $h \rightarrow ?$ rule might equally well employ [-Tense] in the specification of the "Resonants," with the apparent result that Voice plays but a minor role in Twana phonology.

IV.5.3. Stridency

As has been discussed above (Instantaneous Release, Chap. IV, sec. 4.2), stridency is to be equated not simply with 'non-instantaneous release', which pertains to both continuants and affricates, but rather with greater noisiness on the part of one member of a pair of otherwise identical continuants or affricates.

Thus the contrast between Twana t vs. c is conveyed by the value of the feature [Instantaneous Release] and not by [Strident]. On the other hand, non-distinctive Stridency must be marked for all segments not covered in this respect by redundancy rules.¹ It is thus necessary to note that Twana s,c,č,š,j are redundantly [+Strident].

¹For instance, Vowels are [-Strident] by a redundancy rule.

The pair $x^w - x^w$ differ by stridency, but since they are phonetically parallel to the [+Back] pair $(k)(w) - (q)(w)$ already distinguished by [High], this difference must be considered non-distinctive.

Thus stridency, like voice, plays no significant role in Twana phonology.

		p	b	m	t	d	n	s	c	ʒ	ɬ	ɕ	j	ʃ	k	k ^w	g	g ^w	q	q ^w	(x)	x ^w	x̣	x̣ ^w	w	l	y	ʔ	h
Major	Sonorant	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+
	Consonant	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	-	-	-
	Syllabic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cavity	Labial	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
	Anterior	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-
	Coronal	-	-	-	+	+	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-
	High	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+	+	-	-	+	+	-	-	-	+	-	-
	Low	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+
	Back	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+	-	-	-	+	+
	Round	+	+	+	-	-	-	-	-	-	-	-	-	-	-	+	-	+	-	+	-	+	-	+	+	-	-	-	-
	2nd'y Ap.	-	-	+	-	-	+	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-
	ʔ-constric.	ɬ	-	(ɬ)	ɬ	-	(ɬ)	-	ɬ	-	+	-	ɬ	-	ɬ	ɬ	-	-	ɬ	ɬ	-	-	-	-	(ɬ)	(ɬ)	(ɬ)	+	-
Manner	Continuant	-	-	-	-	-	+	-	-	-	+	-	-	+	-	-	-	-	-	-	+	+	+	+	+	+	+	-	+
	Inst. Rel.	+	+		+	+		-	-	-		-	-		+	+	+	+	+	+								+	
	Raised lar.	ɬ	-	-	ɬ	-	-	-	ɬ	-	+	-	ɬ	-	ɬ	ɬ	-	-	ɬ	ɬ	-	-	-	-	-	-	-	+	-
	Tense	+	-	-	+	-	-	+	-	+		+	-		+	+	-	-	+	+					-	-	-	+	-
Source	Voice	-	+	+	-	+	+	-	-	+	-	-	+	-	-	-	+	+	-	-	-	-	-	-	+	+	+	-	-

Fig. 68.--Distinctive Features of the Twana Consonants¹¹For vowels, see Chap. IV, secs. 3.3.2 and 4.4.2.4.ɬ = A segment occurs for each value in the dictionary, and the output.(ɬ)=Probably only as result of glottal absorption; hence only in output segments.

APPENDIX I

TWANA TEXT

I.1. A Note on the Transcriptions

The Text of the Tale is given in three parallel transcriptions.¹

1. Modified IPA. I employ, largely for typographical convenience, \check{s} , \check{c} , $\check{x}^{(w)}$, $\underset{\cdot}{l}$, $\underset{\cdot}{l}$ for \int , $t\int$, $\chi^{(w)}$, ɬ and 'syllabic l,' for the consonants. So far as the vowels are concerned, I use [æ] in the Tale (as against the more convenient single symbol [e] in the main text of the thesis) for the slightly lowered mid-front vowel; and [ɔ̃] for the slightly raised mid-back rounded vowel. Rounded shwa is [ɔ̃^v].²

2. Approximately phonemic. This transcription corresponds to a representation of surface contrasts (presented in Corpora Figs. 48-49 in Section 1 of Chapter IV, Phonetic Output); note that I also represent the syllabic-offglide allophone of $\underset{\cdot}{l}$, thus $\underset{\cdot}{l}l$.

3. Systematic phonemic. This transcription gives the morphemes their dictionary representation, i.e., the representation which is submitted to the Phonological rules of the grammar.³

¹This unusual step was dictated by a concern to meet the need of Salishans as well as general linguists. Since it is the 'broad' (surface contrast) transcription that will meet the criticism of many general linguists, it must be noted that some kind of 'phonemicization' is required if texts are to be printed. An IPA representation is much too cluttered on the one hand, while morphophonemic contractions obscure important points of interest. On the other hand, texts can hardly be 'read' if they are to be transcribed in Systematic Phonemes, for many shapes must be submitted to large numbers of rules if they are to be pronounceable.

²For the Appendices, [ɔ̃^v] is used only in the 'phonetic' transcription of the Text of the Tale, as is [a] for *a = /a/.

³√ indicates a putative root, wherever this is clear to me.
- indicates a morpheme-boundary. Always given for underlying forms; given for surface representations only when necessary for the argument.

Note: *e, o, a, ə : but / i, e; u, o; a; ə /

I nowhere represent either speed of utterance or intonation, although the Commentary (sec. 5, passim) mentions further P-processes due to extra (undefined) speed of utterance.

1.2. A Note on the Tale

Although I have given the Tale a neutral title, it is really part of a corpus of Twana tales¹ concerning the 'transforming' functions of the world-changer and culture-giver Duk^wibai, chosen as supplementing the two tales concerning Duk^wibai given by Elmendorf (1961, Myths 2 and 3).

The present tale links Duk^wibai to both the myth-world and the present-day world.² In it, the Duk^wibai is seen in two episodes of his journey, a journey whose purpose is the preparation of the environment and the people for each other. The two episodes here presented are unusual in having no specific location,³ although the Twana culture-area (Hood's Canal and its environs) is clearly implied: Loon goes 'down to the bay' (informant's translation); the Twana *ædak^w*, 'sea, big water';⁴ and Duk^wibai proceeds 'along the beach,' i.e., the Canal itself.

It is important that the behavior of Duk^wibai is in no way to be interpreted as punitive or merely spiteful in his treatment of the three 'people' in the tale. Although arbitrary in his choice of transformations, Duk^wibai is in fact performing part of the essential task of providing 'food for the future generations.' It is not without interest that whereas the provision of animals as food for mankind is fundamental to all creation myths, their creation out of men is an uncommon variant.

A few points in the text require explication in terms of the general

¹I do not know just how widespread the Duk^wibai tales are over the Salish, or perhaps even neighboring language-speaking areas.

²For the cosmological beliefs of the Twana, see Elmendorf (1960), pp. 535-537.

³Compare Elmendorf (1961). The episodes of the 'Journey of the Transformer' (No. 12 in my own unpublished text collection) are attached to quite specific place-names.

⁴'The Bay' seems to refer to Annas Bay, where the Skokomish River empties into Hood's Canal.

cultural background. For ease of reference, these are here given sentence (S) by sentence.

S.1. 'They heard about it.' The reference is to the coming of Duk^wibał.

S.2. 'Shag marked Loon.' The characters are two people, although given their later, non-human names. These two have decided to 'dress up' for the imminent visit of Duk^wibał.

S.4 and S.23. 'There was Duk^wibał, watching.' It is perhaps implied that Duk^wibał approached invisibly: on the other hand, the power to render himself invisible is, to my knowledge, nowhere explicitly attributed to Duk^wibał.

S.17 and S.34. The new, non-human identities of Shag, Loon and Filer are not made explicit in Duk^wibał's speech. For Shag and Filer, Duk^wibał performs an act symbolic of the transformation; for Loon, on the other hand, only the characteristic 'hollering' is presented. In each case the story-teller, chorus-like, supplies the explicit identity. To the listener, the added dimension of anticipation is given by the names of the characters involved.

S.22. 'It's my gift for Duk^wibał.' Although unclear from the immediate context, it was explained by my informant that Filer's intention is to murder Duk^wibał. If 'gift' is the correct gloss (see Note 80, Appendix I, sec. 5), Filer's comment is ironically evasive, as compared with the naive lie of Shag and Loon (S.9). In both cases covert, if not overt recognition of Duk^wibał is implied.

I.3. Text and Interlinear Translation

S.1.

[tólastəbdux^w ʔo qoʔóla wəɪ báčəd.]

/ túlastəbdəx^w ʔu quʔúle wəɪ báčəd /

\$ [tól-a-st-m-nəx^w # ʔo # qoʔóleh # wəɪ # fmákan \$

1 2 3 4 5 6 7 8 9

They heard about it, Loon and Shag.

S.2.

[ʔədʔóy xəlʔátəbdux^w qəʔóla ʔo báčad ʔadə ʔasʔóɫ .]

/ ʔədʔúy xəlʔátəbdəx^w qəʔúla ʔu báčad ʔadə ʔasʔúɫ . /

\$ ʔən # ʔhóy # ʔxəlʔ - ʔ-t-m-nəx^w # ʔqəʔólah # ʔu # ʔmákan # ʔə-t-ə- ʔas-ʔʔóɫ \$

10 11 12 13 14 4 5 7 6 9 15 16 17
and then Shag marked Loon with black.

S.3.

[ʔkʷádux^w təsux^w tálʔčəs ʔaté páq .]

/ ʔkʷádəx^w təsəx^w tálʔčəs ʔatí páq . /

\$ ʔpák^w-ə-nəx^w # t-ə-s-əx^w- ʔtálékan-as # ʔə-t-é - ʔpáq \$

18 13 5 15 19 20 21 22 15 23
He spotted his back with white.

S.4.

[qáʔwe bʔas.átədbatəb dúkʷəbaɫ ʔaslaɫʔábatəbʔəɫ]

/ qáʔwi bʔassátədbatəb dúkʷibəɫ ʔaslaɫʔábatəbʔəɫ /

\$ qáʔweh # ʔam # ʔas-ʔsát-a-n-mt-m # ʔnókʷəmaɫ # ʔas-la-ʔláʔm-a-t-m-wəɫ \$

24 25 26 16 27 28 4 29 16 30 31 2 14 4 32
There was Dukʷibəɫ, too, standing watching them.

S.5.

[xʷpósəbdux^wut xáəʔdux^wudux^w dúkʷəbaɫ, ʔət ʔəwáqədəx^w]

/ xʷpúsəbdəx^wət xéʔdəx^wdəx^w dúkʷibəɫ ʔət ʔəwáqədəx^w /

\$ ʔxʷáp-ós-a-m-nəx^wət # ʔxéʔ-nəx^w-nəx^w # ʔnókʷəmaɫ # ʔən # ʔəwáq-nəx^w \$

33 2 4 5 34 35 5 5 29 10 37 5
Looked up and saw him, Dukʷibəɫ, and it frightened them

S.6., S.7.

[ʔəd hóy , báɫəcəb beʔəʔəe x.čəɫdubčəqəʔwi .]

/ ʔəd húy báɫəcəb biʔeʔéxčəɫəbčə qəʔwi /

\$ ʔən # ʔhóy # ʔmáɫ-n-s-m # me-ʔeʔéxkn-m-k # qəʔweh \$

10 11 38 39 40 4 41 42 4 43 24 25
And then, he asks them: 'What are you doing?'

S.8., S.9.

[ʔó . dáɬq^wbetéq^wab . k^wɔ^wdátəbdux^w ʔo dúk^webaɬ tečéʔwi]
 / ʔú . dáɬq^wbitéq^wab . /k^wɔ^wdátəbdax^w ʔu dúk^wibaɬ tičíʔwi /
 \$ ʔó \$ ʔəná-ɬ # q^w # me-ʔtéq^w-a-m \$ ʔk^wə^wn-á-t-m-nx^w # ʔo # ʔnók^wemaɬ # t-e-ké-ʔweh #
 44 45 46 47 41 48 2 4 49 2 14 4 5 6 29 50

'oh. We're just playing.' Duk^wibaɬ took that,

S.9.

[tədəwbašaq^wéčətəwəlbəsʔəɬ]
 / tədəwbašaq^wíčətəwəlbəsʔəɬ /
 # tə-nx^w-me-ʔxáq^w-ékan-t-wl-mn-as-wəɬ \$
 15 5 41 51 21 14 52 53 22 32

what they were staining each other's backs with.

S.10., S.11.

[šaq^wáʔtəbdux^w báčad . ʔasʔóɬ .]
 / šaq^wáʔtəbdax^w báčad . ʔasʔúɬ . /
 \$ ʔxáq^w-á-ʔ-t-m-nx^w # ʔmákan \$ ʔas-ʔxóɬ \$
 51 13 54 14 4 5 9 16 17

He stained him, Shag: he was black.

S.12.

[cɔ^ʔ ʔədádúx^wčq^wskáwɬəbs ɬax^wáʔwat .]
 / cɔ ʔədádəxčq^wskáwɬəbs ɬax^wáʔwat . /
 \$ ʔcóh # ʔəná-nx^w-k # q^w # s-ʔkáwɬəm-as # ɬ-ax^w-á-ʔwát \$
 55 45 5 43 47 19 56 22 57

'Now you'll just be food for the future generations.'

S.13, S.14.

[hédabdux^w qóʔóla ʔax^wo tesédak^w . ʔaq^wstátaiqab.]

/ hídadbx^w qúʔúla ʔax^wu tisídak^w . ʔaq^wstátaiqab. /

\$fén-a-m-nx^w # fqóʔóləh # ʔax^wo # t-e- fén-ak^w \$ ʔaq^w # s-tá-fátai-q-m \$

58 3 4 5

7

59

15

68

61

19

30

62

63

4

Loon went to the bay.

He went along hollering.

S.15.

[hédabdux^w suʔwut báčad ʔax^wo]

/ hídadbx^w səʔwat báčad ʔax^wu /

\$fén-a-m-nx^w # s-fwat # fmákan # ʔax^wo #

58 3 4 5

64

9

59

He went along, what's-his-name, Shag, to

S.15, S.16.

[tesədux^w íq^waq^wəlcá'idux^w təlsʔas.átadabəc]

/ tisədux^w íq^waq^wəlcó'idax^w təlsʔassótadbəts /

#t-e - s- nx^w-fíq^w-éq^wan \$ í-cá'y-nx^w # tə-l-s-ʔas-fsót-a-n-mt-as \$

15

19

5

65

66

67

5

15

68

19

16

27

28

22

the 'wind-fall' .

There's where he'll be standing.

S.17.

[hóydux^w ubʔq^wobəš]

/ húydux^w bəʔq^wubəš /

\$fhóy-nx^w # fbəʔq-omx \$

11

5

69

70

He became 'Duck.'

S.18, S.19.

[pátšidubdux^w dúk^webał , heʔʔ ʔač taspłáči .]

/pátšadabdux^w dúk^wibał , hiʔó ʔač taspłáči ./

\$pát-xn-m-nx^w # fnók^wemał \$ heʔó-h # ʔák # tə - s-pátáke \$

71 72 45 29 73 74 85 15 19 76

Duk^wibał set off again. He was coming along, up the beach.

S.20, S.21, S.22.

[désacədux^w tečéʔwi beyəqáb . yáqəyáq, dasadábš

/dísacədux^w tičiʔwi beyəqáb . yáq yáq . dasadábš

\$fnéx-a-n-s-nx^w # t-e-kéʔweh#me-ʔyáq-ə-m \$/yáq #/yáq \$ n-s-fnám-x #

77 2 39 40 5 50 41 78 13 4 78 78 79 19 80 81

He got to that one filing 'Yáq Yáq' '(It's) my gift for

S.22, S.23.

[lecədúk^webał . dāx^wub ʔas.átadbədux^w dúk^webał ʔəslalʔábad .]

/licədúk^wibał . dāx^wəb ʔassátadbədux^w dúk^wibał ʔəslalʔábad ./

1-e-t-s-fnók^wemał \$ fnáx^w-m # ʔasfəsət-a-n-m-nx^w # fnók^wemał # ʔas-la-fláʔm-a-n \$

82 40 29 83 4 16 27 4 5 29 16 30 2 39

Duk^wibał There stood Duk^wibał, watching him.

S.24, S.25, S.26.

[báləcabdux^w , beʔeʔéduʔwutč qaʔwi , beʔəʔəʔidubčqaʔwi .]

/báləcabdux^w , biʔiʔidaʔwutč qaʔwi , biʔeʔéxčadabč qaʔwi ./

\$fmał-n-s-m-nx^w\$ meʔeʔ énoʔwat-k # qá-ʔweh\$ me-ʔe ʔéxək-a-n-m-k # qá-ʔweh \$

38 39 40 4 5 41 84 43 24 25 41 85 4 43 24 25

He asks of him: 'Whatever are you saying? Whatever are you doing?'

S.27, S.28, S.29, S.30.

[ʔó . ʔadáččq^wbeyočád tešówʔ . háyʔ heʔáx^wai . čábaš .]
 / ʔú . ʔadáččq^wbiyačód tišáwʔ . háyʔ hiʔóx^wai . čábaš /
 \$ ʔó \$ ʔaná-kn # q^w # me-ʔyšq-š-n # t-e-ʔxáwʔ \$ háyʔ # ʔhéʔóx^wai \$ ʔkám-a-x \$
 44 45 86 47 41 51 13 16 15 87 88 89 90 2 8

'Oh, I'm just filing this bone.' 'Give it to me.' He gives it to him.

S.3, S.32.

[tčátabdux^w ʔax^wo tščlʔášis . cš^ ʔsólɪdux^w .]
 / tčátabdux^w ʔax^wu tščlʔášis . có ʔsúɪdux^w . /
 \$ ʔák-š-t-m-nx^w # ʔax^wo # tə-s-ʔkáləh-xn-as \$ ʔcoh # ʔsól-h-nx^w \$
 91 13 14 4 5 59 15 19 91 72 22 55 93 74 5

Puts it on him, on his front leg. 'Now go along.'

S.33, S.34.

[ʔadáččq^wʔskáwɪəbs ɪax^wáʔwat . hédəbdux^w sɪx^wéšɪdux^w .]
 / ʔadáččq^wʔskáwɪəbs ɪax^wáʔwat . hídəbdax^w sɪx^wíššədux^w . /
 \$ ʔaná-k # q^w # ɪ-s-ʔkáwɪ-m-as # ɪ-ax^w-áʔwat \$ ʔhén-a-m-nx^w # s-ʔx^wés-xn-nx^w \$
 45 43 47 68 19 56 22 57 58 2 3 5 19 94 72 5

You'll just be food for the future generations.' Off he went, got to be Deer.

I.4. Literary Translation

Loon and Shag heard that Duk^wibai was coming, so they decided to dress up. Then Shag painted Loon black, but spotted him with white on his back. But there was Duk^wibai, standing watching them.

They looked up and saw him, and they were frightened. Then he asked them: 'What on earth are you doing?' 'Oh, we're just playing,' they reply.

Then Duk^wibai took the stuff they were painting each other's backs with, and stained Shag so that he was black all over. 'Now you'll just be food for the future generations,' he tells them. So Loon went down to the Bay, hollering as he went. And What's-his-name, Shag, he went along to

a wind-fallen tree, and there's where he'll be standing generally. He became 'Duck.'

Then Duk^wibał set off again, and came along the beach. He came to the one who was filing. 'Yáq, yáq' went the file. 'This is my gift for Duk^wibał,' said Filer.

But there stood Duk^wibał, watching him. He asks him: 'What's that you were saying? And what on earth are you doing?' 'Oh, I'm just filing this bone,' is the answer. 'Give it to me!' says Duk^wibał. He gives it to him. Then Duk^wibał claps it on Filer's arm, saying: 'Off you go now! You'll just be food for the future generations!'

Off went Filer, and now he'd become 'Deer.'

I.5. Commentary on the Text

I.5.1. Notes on the Text¹

S.1. 1. *tól Root(?), 'find out.'

But possibly * $\sqrt{t\acute{o}-1}$, with 1-directional. Cf. / tulúcad / 'North wind,' with *ócan, bound pronominal for 'mouth' and /tusəbádíd/ , 'West wind,' i.e., 'from the mountain' (*s-mánen).

2. *a Transitive stem-formative.

Cf. S. 4, 5, 8, 20, 33

Contrast Note 13, on stem-formative for transitive.

3. *st Causative(?). Probably *s, 'causative,' plus *t, 'transitive (general).'

4. *m (a) Pronominal is recipient of action (cf. Hess [1967]

'specific goal'). Cf. S.4, 5, etc.

(b) Action is for the interest or benefit of pronominal, as

in S. 9 /k^wədátəbdəx^w/, 'he took it' (see Note 49).

¹I am indebted to L. C. Thompson for much valuable criticism of an early draft of this Commentary.

Note: * indicates underlying representations.

// indicate surface contrasts (roughly, phonemic transcription).

5. *nax^w (a) Probably *n 'intentional' 'responsible' transitive (Hess 1967) *ax^w (or simply *x^w, with 'inserted shwa'), 'change of state.' (Cp. Dative [note 40] and General transitive [note 14]) Cf. S. 2, 3, 5, 9, 10, etc. S. 32 /ʔsúldax^w/, 'go.' shows the same output for semantic imperative.
- (b) Nominalizing prefix *n(ə)x^w.
- S. 9 shows *n(ə)x^w - m(ə)n, as Instrumental frame.
- S. 15 shows *n(ə)x^w-, in suffixless Nominalization.
- S. 3 *s & (ə)x^w- treated in notes 19, 20.
- (c) The apparently reduplicating /-dax^w-dax^w/, at S. 5 is treated in note 35.
- (d) N.B. In fast speech /-dax^w/ becomes /-dəw/. See S. 9 in text /tə-dax^w-/ → [tədəw-].

N.B. It is aspect and not tense that dominates the Twana verb system.

For some of the various verb affixes, see Fig. 69. Also the following notes. Cf. Progressive (note 41), Stative (note 16), Expective (note 68) (Fig. 72), Intensive (note 30), derived Incompletive (?) (note 74), əx^w change of state (note 5).

6. *ʔə Obviative article,¹ for use with Agent noun (not pronoun).

Cf. S. 2, 9.

7. *qəʔólah Noun stem only. Possibly contains *qəʔ, 'water.'

8. *w(ə)l Conjunctive particle (NP + NP).

Compare *w(ə)l, 3rd plural pronominal suffix (note 32).

9. *mékan Root(?), 'shag.' Possibly complex i.e., *mak-a-n, with *n Nominalizer suffix. For *n Nominalizer, cf. S.3. *ék-a-n 'back' (note 21), S. 15 *éq^w-a-n 'head' (note 66).

¹But possibly to be compared with /-u/ in /ʔəx^wu/. See note 59.

S.2. 10. *ʔ(ə)n Conjunctive particle (S + S)

Cf. S.5 /ʔat~at/ (notes 34, 36), S.6 /ʔəd/

11. *hóy (a) makes (S + S) Conjunctive phrase, in env *ʔ(ə)n& -

Cf. also S. 6.

(b) as root, 'become.' Cf. S. 17.

(c) elsewhere, also 'make, complete.'

(d) cf. also /húyʔ/, 'goodbye.'

12. *xəlʔ Root, 'stain, smear, paint.'

Elsewhere, 'write, draw'

13. *ə Transitive stem formative; for a large class of roots, as in S. 9, 19, 27, 30, a 'copy of the root vowel'. Contrast note 2.

14. t General transitive marker, as in S. 4, 7, 9, 10, 31 (see Fig.69).

Compare 'intentional' (note 5), 'dative' (note 40).

15. *ʔ(ə)tə Complex Determiner (see Fig. 74[d]).

(a) *ʔə - 'by means of,' in env/ - & Article, as here.

Compare the usage in/biʔfɪstəb ʔətə qubqubəx^w/, 'he fed her on bones.'

*t- 'Definite' marker. Cf. *t, 'Completive,' with which 'Definite' is probably historically identical (cf. now parallel for *i in notes 68, 82).

*e- Immediate interest (compare note 82 for morpheme-order in the environment / i -)

*ə- Non-marked interest.

N.B. Compare 2nd person singular possessive *ʔe(s), as in /tɪʔɪsk^wtábac/ (*t-e-ʔe-s-√k^wətábac) 'your husband'

(b) /ʔte/ in S. 3.

/te / in S. 13, 15, 28.

/tə / in S. 9, 16, 19, 31.

/t/ in S. 22 (note 82).

(c) Compare also /tičiʔwih/ of S. 9 (note 50), a Demonstrative.

16. *ʔas Stative prefix.

Cf. /ʔas- / in S. 4, 11, 16, 23.

/ʔəs- / in S. 4.

See footnote to note 5, for aspects.

17. ʔóɿ Root, 'black.' As in citation, so in running speech, most color words are Statives. Compare /ʔasčíq /, 'red,' and /ʔasq^wix /, 'green.' But contrast /páq/, 'white,' in S. 3 (note 23).

S. 3. 18. *pá^wk Root, 'spot.' See Chap. II for the shwa root vocalism, and Fig. 75 for the shapes of roots.

19. *s Nominalizing prefix.

(a) Before root in S. 15, 19, 22, 31, 33, 34.

(b) Before further prefixes: Nominalizing S. 3 (note 19), S. 15; Stative S. 16; Intensive S. 14.

* (ə)x^w Derivational prefix.

(a) In the present instance, the semantics of the derivation is unclear (see below note 21).

(b) Agent prefix, as in /s-(ə)x^w-xəl^ʔ-ə-b/ 'writer,' cf. xəl^ʔ

N.B. For function of -(ə)x^w, 'change of state,' see note 5.

21. *tálekan Probably *√tál-ékan, 'back.' Citation form is /səx^wtál^ʔčəd/, showing *s-(ə)x^w- prefix complex (see notes 19, 20, also 5).

The bound pronominal for 'back' is /-íčəd/ (as in S. 9). In

the alternant /cálíčad/, it is difficult to account for the initial /c/-: a wholly unproductive metathesis must be supposed, from *s-t- to /ts/, with loss of morpheme-boundary. If we assume such a process to have occurred, then stress-alternation of a kind fairly common in Twana (see Chap. II, sec. 21) gives the alternants

- (1) *s-(ə)x^w- tál-ekan gives /səx^wtál[?]čad/, while
 (2) *s- tal-ékan gives / cəlíčad/, assuming metathesis.

N.B. For loss of final *-n, see Chap. II, sec. 19.

22. *as Possessive 3rd singular suffix. /-as ~ -s /, by stress rule.

23. *páq Root, 'white.' But contrast other color words appearing as Statives, e.g., 'black' (note 17).

S.4. 24. *qáh Particle partaking in a number of constructions.

- (a) Here, exclamatory, in env/ *-[?]weh + S. 'my goodness!'
 (b) In S. 25, 26, exclamatory, in env/ S + [?]weh 'what on earth?'
 (c) Elsewhere i) As Aux, as in /qá[?]wíčad qə[?]áhtəbəd / 'May I die'
 ii) Negative, as in /x^wá[?]qáh, 'no'
 and in /qək^wləsəsáqá[?]aləd/ 'There'll
 be no fish-run.'
 iii) Possibility, as in /su[?]úcadəbčəqə[?]/ 'I can
 cook,' probably *qáh-l, with *l, 'expective,
 unrealized' (cf. note 68).

¹ But *tál must also be glossed 'back,' as in /səx^wtál[?]q^wəd/, 'back of head,' where the bound pronominal for 'head' is *éq^wan, /-iq^wad/.

*ékan for Twana, despite *ek for other Salish languages. Of course, *ekan can be considered complex, e.g., *ik-a-n, where n is a Nominalizing suffix (cf. a similar treatment for *éq^wan (note 66) as *éq^w-a-n is possible).

25. *weh Particle(?), 'existence.'

(a) Cf. here, in env/ *qəh - , see note 24. Also in S. 24, 25.

(b) Question Yes-No particle, as in /pə́qə́wi/, 'is it white?';
cf. pə́q 'white.'

(c) In /wát/, 'who,' 'person,' as in (S. 15) /sə́wat/, 'what's-
his-name' (note 64), and /lax^wá́wat/ 'future persons,' (note

(d) In /tičⁱwi/, 'that one,' S. 9 (note 50)

24/25. N.B. /qáwi/ → /qáwə, qáw / in fast speech (cf. /tičⁱwi/ note 50)

26. *ʔ(ə)m Particle, 'in addition, renewed activity' (Fig. 72).

Cf. /ʔəb cə́dɪ/ 'he too';

/ʔəb ʔilal cə(h)/ 'he sang again.' *cəh here is optional.

27. *sət-a-n Stem, 'stand,' = *sət, root; *a , stem-formative (cf. transi-
tive stem-formative as copy of root vowel, note 2); *n, 'transi-
tive intentional' (note 39).28. *m(ə)t Reflexive is possibly *t , or *m(ə)t. If *t, then *m is un-
identified, since *m, 'specific goal' (note 4) is also present,
finally. Cf. S. 16 for the same verb without final *m.

Cf. /biqə́sčəd/, 'I scratch it,' (with /qə́s/ 'scratch') vs.

/bəqsə́dəbətčəd/, 'I scratch myself' (with /bəqsə́d/, 'nose').

29. *nók^weməɪ Proper name, 'Duk^wibəɪ.' The shape as well as the etymon
is common to Puget Sound Salish and Twana.¹ No satisfactory
etymology has so far been offered. If the underlying shape is
indeed *nók^wiməɪ, then we must consider it an unassimilated
loan-word in Twana, to be marked accordingly in the dictionary,
for its shape contradicts Twana rules for vowel loss: it

¹I do not know how widespread this name is among Salish tribes.

should be ****[dúk^wəbəl]** (see Chap. II, sec. 11). A second ground on which this is an unassimilated loan lies in the allophony of the stressed vowel, for we hear [dúk^wəbəl],¹ with a [+High] vowel. Cf. /dók^w/, [dók^w], 'change.'

30. ***la** Durative/Intensive reduplication, C₁V₁ as prefix. Here, *l[?]ám (note 31). Cf. note 84. But Intensive is usually C₁V₁. Cf. S. 14 /tátatqəb/, 'holler,' from /tátqəb/, 'shout' (note 62,63).

31. ***l[?]ám**(~ lá[?]m) Root, 'look.' Elmendorf's /lá[?]b/ makes the reduplicating more straightforwardly C₁V₁.

32. ***^lw(ə)l** Plural (3rd person only), Agent or Object (optional). Probably identical with *w(ə)l, 'conjunction' for NP + NP (note 8).

- S.5. 33. ***x^wəp-ós** Root *x^wəp, 'raise'(?). *ós, bound pronominal, 'face.' Cf. /x^wácačəbčəd/, 'I raise (my) hand,' with bound pronominal *áki(h), 'hand.' The difference between *x^wəp and *x^wác is not clear, but possibly the sub-analysis should be *x^w-p, *x^w-a-c.

34. ***ət** A variant of *[?]ən, Conjunction (note 10).

35. ***xé[?]** Root, 'see.'

Apparently-reduplicating /-d x^w/ is a problem.

- (a) It may be that /-d x^w/ makes a derived stem /xé[?]-d x^w/, in which case the second occurrence of /d x^w/ = *n-(ə)x^w (note 5).

¹An allophony of stressed *ō heard again only in [dušúyay] 'wolf.' But see Chap. IV, sec. 4.4.2.

(b) These may be the exponents of a 'double object,'

glossable as 'they saw him at it.'

36. *(ə)n See note 10.

37. *lawáq Root, 'afraid,' Cf. /ʔasčípalčəd/, 'I'm afraid,' vs. /ʔaslawáqčəd/, with semantic distinction unclear. Whether we gloss 'it frightened them' or simply 'they were afraid,' 3rd person marker is optional, and here absent.

S.6/7. 38. *mál Root, 'ask.'

39. *t General transitive (note 14). Here, with Dative (note 40).

40. *s Transitive Dative (purpose, or even causative [?]). Cf., similarly, /ʔíwad/, 'invite, call': /ʔíwacədax^w/, 'call to him,' = *ʔéw-a-t-g-n-(ə)x^w.

41. *me Aspectual prefix, Progressive (cf. N.B. to note 5).

42. *ʔe-ʔéxkn Stem, reduplicating (intensive?). Probably *ʔéxk-n, Root *ʔéx, 'scrape' (here?). *k = ? . If the root (or, of course, complex stem) is *ʔéx(V)k, then the meaning of this element is unclear, owing to the idiomatic usage here. For *n, see note 5.

43. *k Second singular pronom. particle. From the Twana shapes (see Fig. 74[a]) there seems little point in paralleling Hess' (1967) (360.01) analysis, and taking /č/ (*k) as 'independent predication marker.'

S.8. 44. *ʔó Exclamatory particle, 'oh!'

45. *ʔ(ə)ná Auxiliary¹ 'just.' Cf. S.12, 28. Requires connective

¹Typically, the Auxiliary takes person markers, but not aspectual prefixes. This is a characteristic Salish syntactical usage (see note to Chap. I, sec. 1). For other adverbs in Auxiliary use requiring *q^w, cf. /həčq^w ʔasʔálah/, 'you look sick' (*hə[?] 'seem') /códq^w bót sl.áday tábəq^w íc/ 'there were only women dancing' (*cón, 'only')

particle *q^w (note 47), with ensuing surface strings of the shape *ʔ(ə)nǎ+person suffix +q^w + Aspect prefix+root. For the shape /dǎ/ in fast speech, cf. S. 23 (note 83).

46. *ǎ Pronom. particle, 1st person plural, 'we, us.' Contrast *ǎ aspectual (note 68).

47. *q^w Connective particle, in env/ Aux - Verb Phrase. If this is to be identified with the homophonous particle *q^w, 'because,' then the common semantics suggested is perhaps 'evidential.'

48. *téq^w Root, 'play.' Cf. Nominalization /stíq^wab/, 'game, toy.'

- S.9. 49. *k^wǎn Root, 'take hold of, hold.'

/k^wǎdátǎbdǎx^w/ shows double transitive marking; *t, 'general transitive,' and *n, 'intentional.' We also note the use of the recipient suffix *m, here signifying 'for one's own benefit.'

50. *t-e-ké-ʔweh Demonstrative, consisting of *t, Definite; *e, near interest (note 15); *ké 'that'; *ʔweh 'existant' (note 25). *ké, is found only in Demonstrative.

N.B. In fast speech /tíǎíʔwǎ/ (cf. note 25 for /qǎʔwǎ/).

51. *xǎq Root, 'stain.'

52. *w(ə)l Reflexive suffix.

53. *mn Nominalizing suffix, with *n(ə)x^w-root -.

*n is here lost (see n-loss, Chap. II).

- S.10. 54. *ʔ The intermittent occurrence of /ʔ/ in such transitive constructions makes it uncertain, but paradigms suggest it may be an allomorph of *n 'intentional.'

- S.11. Note here the juxtaposition of predicates, with 'sequential' implication. Thus (S. 10), 'He stained shag,' then (S. 11) 'so he was black.'
- S.12. 55. *cóh Particle, 'let's.' Cf. /có bitíq^wabí/ 'let's dance.'
Probably not identical with the homophonous *cóh, Aux fn. 1, note 45).
56. *káwíam Probably * káwí-m (or even * káw-i-m), 'nourish,' here 'nourishment' (with *s nominal). Dictionary marking [not k → č] In /skáwíab_s/, the final /-s/ is problematic. The construction looks like a Genitival: cf. /si[?]əhás mǎ[?]əh/, 'dad's house,' from /si[?]əh/ 'house,' and /mǎ[?]əh/ 'dad.' Thus, here 'the nourishment of . . .' and the final /-s/ is really *as, 'possessive' (note 22).
57. *i-ax^w-á-[?]wát Probably consists of
*i, 'unrealized, future,' as in S. 16, 33 (note 68).
Cf. 'absent, fabled past,' as in Determiner in S.22 (note 82)
and 'absent, yonder,' as in Adverb in S. 16 (note 67).
*ax^w 'those who,' as in Nominalizations of the type in prefix
*n-ax^w (perhaps better, *n-ax^w) 'derived agent' as in
S. 9 (note 5[b]). But possibly *a-x^w, with x^w 'Deictic,
Directional' (cf. note 59).
*á[?]wat is either (a) *á[?]wat 'last,' as in /á[?]watčad/ 'I'm last,'
or (b) *á formative, -*á[?]wat 'existant' (note 64).
- S.13. 58. *hén Probably *hén, 'go' (cf. S.19 /hǎč/, notes 73, 74), plus *n
'intentional.' Cf. /hi[?]əx^wat / in S. 29 (note 89).
59. *ax^wó Probably *á (/á ~ ə /), 'subordinate,' with *x^wo,

'directional.'¹

Cf. /^ʔax^wə^ʔwis/ 'up, upwards,' with /^ʔwis / 'high.'

/tədišced ^ʔax^wu sq^wuq^wó^ʔbəš/ 'I arrived at Skokomish,' and

/q^wá^ʔ ^ʔax^wu tisi^ʔə^h / 'far from the house.'

N.B. /q^wú^ʔú^h ^ʔax^wu.../ ---> /q^wú^ʔú^hax^wu / in fast speech.

60. *sénak^w Probably *sén,² 'big',³ although the citation form is /sisíd/, with reduplication. It is unlikely that the underlying shape is *s-hén(a) (with *s, nominal, and *hén(a) as in note 58), since we do not expect h-loss immediately before a stressed vowel⁴. The second element is presumably *(a)k^w, 'water,' although the usual Twana 'water' suffix is *(a)yak^w, as in /^ʔasx^wə^ʔlə^wq^wi^ʔək^w / 'boiling water' (from /^ʔasx^wə^ʔlə^wq^w/ 'burned,' plus *~~h~~-yak^w).

- S.14. 61. *ək^w Probably *^ʔə , 'subordinate,' with *k^w, a determiner particle also found
(a) in one allomorph of 'plural,' as in /tək^wl⁵ lāwalbəš/, 'lots of men' (/lāwalbəš/, 'man, Indian')
(b) in Negative, as in /x^wá^ʔqək^wsqó^ʔodsəbs ^ʔu Jack /, 'Jack won't drink it' (*x^wá^ʔ-qəh-k^w-s- stem+suffixes : cf. Notes 24 [ii], 19 [a]).

¹If 'Obviative' is related, then better to call *x^w 'directional,' or even 'Deictic' (for it may also mean 'until'). Then *ə^ʔ is 'Emphatic.'

²Compare the place-name /q^wəl^ʔsíd/ 'Quillcene,' at the northernmost tip of early Twana territory.

³I find no bound pronominal for 'big,' although /písat/ occurs in place of /sisíd/ with plural nouns.

⁴*s-hén. may still be the origin of this form, if (e.g.) it were a loan from a dialect or language in which h is lost in this environment. Note that it is preferable in such a case to assume a Twana allomorph *en, rather than employ a special h-loss rule for a single form. Cf. *s-háboh 'tale,' where h is retained after s-nominal.

⁵Apparently k^w~q^w. Cf. Chap. II, sec. 2.1. 'Plural types.'

62. *tá1 Root, 'shout.' With 'Intensive Repetitive' Reduplication, 'holler.' For Intensive/Repetitive in C₁V₁, compare /bipáččəd/ 'I'm trying,' and /bipápaččəd/ 'I'm trying things on' (/páč/, 'try').
63. *q Bound pronominal, 'language, speech.' Cf. /sq^wuq^wó^wb^wšq /, 'Skokomish language.' Cf. the free form /slé^wel^wk^wəd/ 'language an Attenuative formation based on *s-^wlék^w-a-d.

S.15. 64. *s-^wwat Here, the unstressed form, 'What's-his-name.' Probably better *s-^wweh-at. See note 25 for *weh and its uses, and cf. S.10 /lax^wá^wwat / (Note 57).

Cf. also /sə^wwát1/ 'whose is it?' with *1 'unspecified.'¹

65. *1^wq Root, 'lick, lap.' See note 66.

But this may be related to /1^wq^wdál/ 'the dead' (-*1h, cf.

Chap. II, sec. 15.9).

66. *éq^wan Possibly *éq^w-a-n, with *a, formative, and *n Nominalizing (cf. *ékan as *ék-a-n at note 21, fn. 1).

This is the bound pronominal 'head.'

The form /tisadəx^w1^wq^waq^wəd/, *t-e-s-n-x^w-^w1^wq^w-eq^wan, is probably an idiomatic expression for 'wind-fall' (i.e., 'wind-fallen tree'). I have assumed the idiom is 'lap-head,'² referring to the head of a fallen river-side tree.

Cf. Nominalizations entailing 'that which,' with /dəx^w- stem -bəd/, (as in S. 16], with the 'Actor' Nominalization here.

¹Or, 1 may be identical with 1 'directional.' Here /t-1/ (*t-1) → [x].

²The present expression should then be an 'Actor' nominalization. Cf. /bətəq^wíq^wəd/ 'licking his head,' from *me- 1^wq^w-éq^w-a-n.

N.B. /sədax^wlāq^waq^wəd ləʔidax^w .../ —> /sədax^wlāq^waq^wəl
ləʔidax^w .../ in fast speech (loss of word-boundary).

Cf. Chap. II, sec. 19 for loss of stem-final *n).

S.16. 67. *lāʔy Possibly *lāʔy[?], with glottal attraction (see Chap. II, sec. 3.3), Adverbial 'there'; with further sub-analysis, *l-āʔy[?], where *l is Directional (but not 'unrealized, absent' (see note 57, 68) despite the semantic agreement: cf. /liʔəh/ 'here').

68. *l Aspectual prefix, 'Unrealized.' (See note 57, N.B. to note 5, and notes 67, 82).

Contrast *l '1st person plural' (note 46).

S.17. 69. *mōʔq Root, 'duck.' Note the neutralization of Rounding, with following * - omʃ, giving /bōʔq^wubəʃ /.

70. *ómx Pluralizing suffix. Although the more specialized identification 'generic plural' would cover the present case, since the species 'duck' is involved, *ómx is not always generic in Twana. See Chap. II, sec. 2. Cf. *mx as bound pronominal for 'people, race,' as in /sq^wuq^wóʔbəʃ/ 'the Skokomish.'

S.18. 71. *pát Root(?), meaning? (See fn. to note 71/72.)

72. *xn Bound pronominal, 'foot.' Cf. S.31 /təʃčə^láʃsəʃ/ (note 92), and S.34 /sx^wíʃsədax^w / (note 94).

71/72. Since *pát does not re-occur in the Twana corpus, we may either attempt another analysis of /pátʃədəbdəx^w/, or seek parallels.

(a) Other analyses. (i) **pátx-n-m-n-əx^w, with **pátx. Roots CVCC are rare, however: this would then be *pátəx, which does not recur in Twana. (ii) **pát-x+ etcetera. An *x suffix is normally Benefactive, however, and this seems not to be the

case here. Cf. S.30 /čábaš/ (note 81). (iii) *pát-xn + etcetera is a plausible analysis, with *xn (note 72).

(b) Parallels. (i) Within Twana, it is tempting to seek a connection with /sptáči / 'beach,' but see note 76 for difficulties. (ii) Squamish /n-páʔsn / 'sole of foot' (Kuipers, 1967) is a very attractive parallel,¹ for it suggests the etymology 'press foot' for Twana *pát-xn, perhaps best now re-interpreted as *páʔ-t (transitive)+ xn.²

S.19. 73. *héʔó Probably *heʔ- ó, or *he-ʔó. For *he(?), cf. notes 58, 89; for *(?)ó 'Emphatic,' cf. fn. 1 to note 59.

74. *h Aspectual suffix, 'Derived Incompletive.' Cf. Attenuative *h (Chap. III). Compare /hiʔúdx^w /, 'come on!' and /hiʔódx^w /, 'he was coming along,' and S. 32 /ʔəsúldx^w / (note 93).

75. *ʔak Preposition, 'In(to), along.'

76. *pátáke 'Beach.' Possibly *pát-á-ken. Here, *pát is almost certainly not connected with *pát of S. 18 (note 71):

- (a) Phonologically, /sptáči / can only be derived from *s-pát-
- (b) Semantically, *pát, 'press' seems remote from the present meaning.

On the other hand, consider Squamish /pós/ 'to land,

¹Especially in view of the connection implied (dictionary entry √píʔ, páʔ, 'grab, seize, get hold of') with Squamish /píʔ-t/, 'grab, tr.,' Coeur d'Alene /piʔ/, 'crush by pressing,' and Kalispel /peʔ/, 'to press, milk a cow': cf. Twana /bepícalʔbəš / 'I'm milking the cow,' suggesting that Twana /píč/ may be from earlier *peʔ-t (transitive) - s (Dative transitive).

²A historical, not a generative re-interpretation. I suggest that ʔ was historically absorbed by t (giving *pát). A similar history may be suggested for the č in /péč- / 'squeeze' as element in 'milk,' in fn. 1 above.

go to shore', with Twana /biptáčəbčəd/ 'I go near the beach (by canoe).' Even more suggestive is Coeur d'Alene /pāt/ 'be smooth,' and Thompson, Tillamook /čín/ 'mouth, edge' (but cf. Twana /úcad/). Thus, possibly 'smooth edge,' with loss of final *n as in a few forms like Twana /səbədɔ́dɪ/ 'mountains,' (cf. /səbádɪd/ 'mountain').

In any case /-áči/ in this form is hardly to be identified with /-áčih/, bound pronominal for 'hand.'

S. 20. 77. *néx ~ *n-?éx Probably best *n-hé-x ; *hé, 'go,' with suffixes *x(?), *n 'intentional,' and *s 'Dative' (notes 27, 39, 40); giving 'get to, arrive at.'

S. 21. 78. *yáq Root, 'file.'

S. 22. 79. *n 1st singular possessive prefix.¹ Cf. its use with obligatorily nominalized verb roots, such as /dəsxáx/ 'I want,' *n-s-xáx.

80. *nám Probably *n-am, *n unidentified prefix; *am, m 'possession.'

Cf. /təbəsəʷádaš/ 'one having spirit power,' from /səʷádaš/; and bəsqʷəbáyʷčəd/ 'I've got a dog,' from /sqʷəbáyʷ/. Cf. *ab in S.30 /čábaš/ (note 90)

81. *x Benefactive suffix. Cf. S.30 /čábaš/ (note 90)

79/80/81. Thus, 'my possession for the sake of,' i.e., 'my gift for.'

82. *i-e-t Determiner (cf. note 15). *i, 'distant, absent,' here 'fabled'; *e, Near interest; *t, Definite.

N.B. As with *t (see note 15), the aspectual *i and determiner i are probably historically identical. However, they behave differently syntactically: *i as aspect 'unrealized'

¹ Possessive markers are prefixes (1st, 2nd persons singular), or suffixes (the rest). (See Fig. 70.)

follows the *t Definite (as in S.16 /təɪs- /), while *ɪ as Determiner 'absent, fabled' precedes it, as in S. 22, the present case.

- S. 23. 83. *náx^w-m Probably *náx^w-a-m (cf. /dák^wabčəd/, 'there I was!'), where *na is to be identified with Auxiliary *ʔəná, 'just' (note 45). The variant occurs in fast speech.¹
- S.24/25. 84. *ʔe-ʔéŋəʔwat Reduplicating Durative Intensive (cf. *la-lʔám, note 30). For meaning, compare /sʔídaʔwat / 'What is it?' Compare also /ʔwát/(note 25), which suggests the analysis *ʔén-ʔwat (note 58 for *hén is relevant). Also interesting is Twana 'heart,' /yədəʔwás/, alternating with /ʔídaʔwat/.
WWE has /ídawʔəcč /, 'what did you say?' showing glottal stop attracted by the stress, and *s, Dative (?).
- S. 26. 85. *ʔé-ʔéxək-a-n Reduplicating Intensive (cf. *tá-tal-q-m, note 62). But the root is probably not *ʔéxək. Rather, compare /ʔəsxčád/, 'how?' from stem /xčád/. Cf. /xčád x^wu /, 'what did he say?' in WWE corpus, with the comment: 'used in enquiring about something not heard or understood correctly.'
- S.27/28. 86. *kn First person singular suffix.
87. *xáwʔ Root, 'bone.' Free variants /šáwʔ ~ šáwʔ/, see Chap. IV, sec. 3.5. Dictionary marking [š → š optional].
- S.29. 88. *háý Exclamation, 'come on, let's.' Cf. /háýʔ bəsaʔáčəb/, 'Let's work.' Cf. note 89 for possible relation to *hě(?) of note 58.

¹The subtlety of the distinction as well as the paucity of examples makes it difficult to decide, but present /ná- / may well be *na, whereas *ʔəná may in reality be *ʔə-ná. *ʔə might then be identical with *ʔə- 'subordinate,' as in /ə-x^wá/ (note 59).

89. *hé-ʔəx^w-aɪ *he is possibly to be identified with *háɪ¹ (note 88). But stressed *hé occurs, as in S. 13 /hídabdəx^w / (note 58). Thus, *he here is better identified with *hé of note 58. A putative *əx^w is not found elsewhere; temporarily, we assume a stem *he-ʔəx^w, 'bring.'

That the stem is not necessarily the whole form *he-ʔəx^waɪ is clear from the contrast /hiʔəx^waɪ / vs. /hiʔəx^wədəx^wstəbəʃ / 'bring it to me.' *aɪ is clearly another morpheme.¹ *aɪ is probably to be identified with the composition-formative (often with adverbial force) found in /stibʔátaɪ x^wúʔbat /, 'man's paddle,' from /stibʔát/ 'male, man,' and /x^wúʔbat/ 'paddle'; cf. also /ʔə sáʔlaɪ ʔəʔwəʃ / 'double-wived,' from /ʔə sáli(h)/, 'two,' and /ʔəʔwəʃ/, 'wife.'

It is of course possible that the semantically significant morpheme here is *ɪ, with *a as a formative. In that case, compare *ɪ in /ɪcʔɪ/ 'there' (note 67), from which we characterize *ɪ as 'Directional,' supported by /čáɪldəx^wstəbəʃ/, 'give it to me' (see note 90 for /č-/).

- S. 30. 90. *kám Stem 'give,' probably 'make, create possession,' thus *k+ám. For *k, 'create, make,' cf. /bəčsiʔəh/ 'build a house,' with *be, 'Progressive aspect,' and /siʔəh/, 'house,' also, cf. /čáɪ-/ (see note 89 for /-aɪ/) in /čáɪldəx^wstəbəʃ/ 'give it to me.' For *am, 'possess,' see notes 80/81 on /dəsəd-abʃ/, and compare /dəščábšəbčəd/, 'I give it away.'

¹On syntactical grounds, almost certainly not to be identified with *aɪ, 'quickly.' Cf. /áɪ tək^wswəčəčəb / 'He's running fast,' and /sisidab ʔətiʔáɪ / 'He's getting bigger fast,' which exemplify the positional constraints on *aɪ, 'fast.'

- S.31. 91. *tāk Root, 'put on.' Cf. /ʔastāčstčad / 'I'm wearing it,' with causative transitive (see note 3).
92. kālāh Root, 'first, foremost, front.' Here, 'front,' as in an animal. Cf. /tāčlāh tək^wtābac/ 'my first husband,' and /čā^llāh tičⁱʔwi dək^wtābac / 'my husband was in front.'
- 92/72 In /čā^lʔāšəs/, stress-shift in the complex *kālāh-xān-as must give *kālāh-xān-as. The development of ʔ and á follow the rules given (see Chap. II).
- S.32. 93. *ʔsól Root (?). Possibly *ʔa-sól. Cf. *sól^ʔ in /súl^ʔ q^wəl^ʔsfd/, 'going to Quilcene,' and *sol in /ʔəsúlābdəx^w/ 'he took it.' Here, with aspectual *h,¹ as in S. 19 /hi^ʔódəx^w/, note 74.
- S.33/34. 94/72. *x^wéC*xn 'Deer.' Almost certainly contains the bound nominal *xn, 'foot.' From the Augmented form, it is clear that the *s- in /sx^wiššəd/ is *s, Nominal. The rest of the shape is obscure.²

I.5.2. Grammatical Morphemes³

To supplement the Commentary on the Tale, we here gather together (Figs. 69-74) a representative sample of non-root morphemes, mainly affixes. These have been arranged for ease of comparison with the relevant Sections in Hess (1967), although (as indicated in the Comentary [Appendix I, sec. 5]) I do not always agree with the analyses or sub-analyses there.

It is clear that non-root morphemes have a variety of shapes: I comment on these in order of departure from the 'canonical' shapes seen in

¹See Chap. II, sec. 15.9 for the alternation.

²I shall rehearse elsewhere my reasons for supposing that the underlying shape of 'deer' is *x^wéh+xn. Is /s-x^wi^ʔay/ 'sheep' related?

³For convenience of external comparison, the transcriptions present surface contrasts.

roots (as illustrated in 'The Shapes of Twana Morphemes,' Appendix II, sec. 2, Figs 75-85).

Personal pronouns (Fig. 71) resemble roots type CVCVC (Fig. 79). These are the nearest in shape to 'canonical' roots.

'Chameleon'¹ morphemes (Fig. 73) are those involved in reduplication of various kinds.

'Grammatical' affixes are again of various shapes, but maximally CVC (Figs. 69, 70, 72).

Particles (Fig. 74) are simple (a,b,c) or complex (d).

(a) Transitivity

-d(əx ^w)	general intention, responsible
-s	purpose, causative
-t	general

(b) Goal of Action

-b	specific goal
-wə1	reciprocal
-t	reflexive
-bəʃ	1st sing.
-i(d)	2nd sing.
-bə1	1st plural

(c) Aspect

bi-	unmarked, present progressive
ʔas-	stative

(d) Derivational

-(a)-b	by means of
-b	internality, and medio-passive

Fig. 69. Morphemes of the Verb System¹ (Selected)

¹Cf. Hess (1967), sec. 311.

¹A 'chameleon' morpheme is one whose shape is controlled by the shape of some element (usually the root) of the stem in which they occur (see Hockett, 1950).

(a) Possessive		
d-	1st sing.	
ʔi(s)-	2nd sing.	
-(a)s	3rd person	
-i	1st plural	
-ləp	2nd plural	
-sʔəi	3rd plural	
<hr/>		
(b)	s-	Nominalizer
<hr/>		
(c)	(-tə)d	Implement
	- aɪ	Attenuative

Fig. 70.--Morphemes of the Substantive System¹ (Selected)¹Cf. Hess (1967), sec. 320.

dacáh	1st person sing.
dəʔwéh	2nd person sing
cədii	3rd person sing.
dibái	1st person plural
təwəlʔwəlap	2nd person plural
cədcədaɪ	3rd person plural
ʔwát	Who?

Fig. 71.--The (Free) Personal Pronouns¹

¹Cf. Hess (1967), sec. 340. Here, there seems little point in attempting any sub-analysis. Second and third persons plural are clearly reduplicating Augmented forms, regularly derived by the rules given in Chap. II of this thesis.

-əx ^w	change of state	
-ʔəb	renewed action	
ɪ-	expective, unrealized	} perhaps better as aspect markers
t-	remote	
-əɪ	desiderative	

Fig. 72.--General Inflectional Affixes¹ (Selected)¹Cf. Hess (1967), sec. 351.

$\frac{C_1 V_1 C_2}{C_1 V_1 + \bar{V}_1 h}$	Augment reduplication (Chapter II)
$\frac{C_1 V_1 + \bar{V}_1 h}{C_1 V_1 + \bar{V}_1 C_2}$	Attenuative reduplication (Chapter III)
$\frac{C_1 V_1}{C_1 V_1}$	Distributive <u>infix</u> (Chapter II)
$\frac{C_1 V_1}{V_1 C_2}$	Intensive reduplication
$\frac{V_1 C_2}{V_1 C_2}$	Inchoative reduplication (Fig. 84).

Fig. 73.--General Derivational Affixes¹ (Selected)¹Cf. Hess (1967), sec. 352.

(a) Pronominal	
-čəd	1st person sing. ¹
-č	2nd person sing.
-Ø	3rd person sing.
-ɪ	1st person plural
-čp	2nd person plural
waɪ ~ ʔəɪ	3rd person plural
(b) Interrogative	
-ʔwi(h)	Interrog.
(c) Determiner	
-t	Definite
-s	Feminine
-i	Near interest
k ^w	Hypothetical
(d) Demonstratives and Deictics	
tiɪɪʔəh	this
tičɪʔwe(h)	that
tičɪʔwe(h)	that (Fem.)
ɪiʔəh	here
ɪiʔfi	over there
ɪcəʔy	way over there

Fig. 74.--Particles² (Selected)¹For the singular only, a sub-analysis is possible. Thus, -č = non-3rd person sing.; -d = 1st person sing.²Cf. Hess (1967), sec. 360.

APPENDIX II

THE SHAPES OF LEXICAL MORPHEMES

II.1. A Note on the Shapes of Morphemes in Twana

The corpora in the body of this thesis are somewhat eclectic, chosen as they were to illustrate the core problems of Twana phonology. To balance the picture slightly, Figures 75-85 present a small sample of non-grammatical morphemes, which it is hoped will be of some interest at least to Salishans. For the (mainly simplex) forms given, the following comments are to be noted, corpus by corpus.

Figure 75 represents a large number of CVC roots, most of which are found as verb stems or nouns. Probably without exception, CVC is the minimal shape for a stem.

Figure 76 shows roots in CCVC. But the Augment process (Chap. II) clearly shows that, with rare exceptions ('pan' is perhaps one), these must be considered underlyingly *CVCVC,² except that clusters with a laryngeal are tolerated.

Figure 77 shows roots in CVCC. We note that very few of these (sub-corpus [a]) do not have a laryngeal in cluster. For these non-laryngeal clusters, 'milk' is clearly a loan, while 'breath' seems to be reduplicating. This leaves only 'cow' and 'midday' as possible -CC types.

Figure 78 shows that CVCVC is a common type, although the -d in 'mountain, slave, food, clear the throat' may be a formative.

Figure 79 shows type CVCVC, another common type. Here only 'leave it' is suspect. This is probably a transitive formation, with typical \check{V}_1

¹For convenience of external comparison, transcriptions present surface contrasts.

²It is recalled that such forms constitute the strongest evidence for the existence of unstressed shwa in dictionary entries.

reduplication (Chap. I, sec. 2.4) and -d, 'Intentional': as an Imperative, however, it is unique in lacking final /-x^w/, Transitive, full form (see Fig. 69).¹

Figure 80 presents forms with medial clusters. Sub-corpus (a) is again (compare Fig. 76) suspect of containing CVCVCVC forms, especially in 'nose' and 'Caucasian' /x^wɔltab/. /pástəd/ 'Caucasian' is, of course, the Salishan shape for 'Boston.' Sub-corpus (b) presents a problem mentioned but not solved in the text (Chap. II, sec. 12.1), that of geminates. Sub-corpus (c) is suggestive of possible sources of such geminates--but these arose in a number of ways at present obscure.

Figure 81 illustrates again laryngeal clusters, this time medially. These laryngeals are all abutting a non-obstruent, which suggests that some of them are not 'original,' especially those with a shwa in the next syllable. Even a form such as /ǵ^wiʔwác/ 'ashes,' may prove to have come from *ǵ^wəywác quite regularly by the rules already given in Chapter II (sec. 1.2.1).

Figure 82 shows longer forms, almost certainly not roots as they stand. I group these by finals, for convenience of external comparison. Possible formative elements to be isolated are:

1. /-d/, Transitive(?); /-əx^w/ (?).
2. /-ádi(h), -áǵi(h), -áyas/ which appear elsewhere as bound pronominal classifiers.
3. /-č-s/, an element (elements?) in the numeral system. The /-č/ element may be related to /čt-/ 'tribelet, decade (?)' (see Fig. 85).

Figure 83 shows reduplicating stems for which I do not find the roots cited independently. Except for 'Holy' and 'oar,' these are all stressed on the first syllable--'oar' is in any case a re-fashioned loan from French (via the Chinook Jargon).

Figure 84 presents a sample of Inchoative stems, for some of which independent roots have been found. These show the inchoative relation, e.g. /bɪx^wčəd/ 'I laugh'; /bɪx^wax^wčəd/ 'I smile'; /k^wɔ́lčəd/ 'I pour'; /k^wɔ́lɔ́lčəd/ 'I spill.' The root /ǵáx^w/ 'freeze' is found with s-Nominal as 'ice.'

Figure 85 illustrates the various shapes of lexical affixes (or field-suffixes: 'bound pronominal classifiers' in this thesis). Lexical affixes are

¹It is of course possible that the -əx^w normally found in Imperative singular formations is really -əx^w, 'change of state' (Fig. 72).

commonly VCVC, with the anti-canonical vowel-initial that does not seem to occur with roots. For convenience of external comparison, the latter type are grouped by finals; this also facilitates isolation of possible formatives, such as /-d/.

II.2. Morpheme Lists

<u>Root</u>	<u>Gloss</u>
pə́q	white
tə́q	close
ciq	red
čáp	aunt
kəs	urinate
k ^w úy	bend
k ^w śq	salt
q ^w áč	vomit
q ^w íc	dance
qax ^w	freeze
síl	cloth
śúx [?]	grind
lúb	scar
x ^w śl	gather
húb	reddden
ʔíx	scrape
yśq ^w	wash
líq	plant, bury
wáq	hurt
qǒ [?]	water
ʔś [?]	hunt
ʔé(h)	yes

Fig. 75.--Roots CVC

	<u>Root</u>	<u>Gloss</u>
(a)	(s) p̌q̌áḅ	flower
	ťǩáx ^w	slap
	ťǩ ^w ús	seven
	ɔ̌x ^w ás	five
	(š) ɕ̌táy	pan
	(ʔəs) q̌ ^w ťáx ^w	thin
	(s) xp̌áb	cockle
<hr/>		
(b)	pš̌ad	comb
	(s) px ^w áb	smoke
	ɕ̌q̌óp	spear
	k ^w táɬ	elk-fat
	(s) ip̌éx ^w	spittle
	x ^w tíl	go down
	(ʔəs) x̌čád	how?
<hr/>		
(c)	ʔwís	high
	ʔláb ~láʔb(WWE)	look
	ʔyáʔ	scrounge

Fig. 76.--Roots CCVC

	<u>Root</u>	<u>Gloss</u>
(a)	q ^w fst	cow
	x ^w ák ^w k ^w	breath
	ták ^w t	mid-day
	mélk	milk
<hr/>		
(b)	súb?	smell
	(s)lúb?	soup
	čób?	jam (tight)
	hí?d	long time
	mí?š	defecate
	ʔé?ɿ	bathe
	bíl?	line up
	tál?	take off
	q ^w úl?	full
	x ^w íl?	lose
	táw?	guess
	táw?	mussel
	šáw?	bone
	(ʔas)láw?	shelled (clams)
	šúy?	incite
	húy?	good-bye
	xəy?	stop someone

Fig. 77.--Roots CVCC

<u>Root</u>	<u>Gloss</u>
(a) sɪdak ^w	sea
ɕɪpəl	fear
tálax	use
(sə)bádɪd	mountain
súq ^w ay	younger sibling
(ʃ)čútax	halibut
bədə(h)	child
(s)təčəd	slave
lúk ^w al	moon
<hr/>	
(b) (s)ʔɪlad	food
sɪlad	provisions
ʔásax ^w	seal (mammal)
ʔúšab	merciful, charitable
(s)ʔúlaɣ	money, something taken care of
ʔəxad	clear the throat
<hr/>	
(c) páʔaq ^w	pipe
kəʔə(h)	mummy
(s)təʔol	herring

Fig. 78.--Roots CVCVC

	<u>Root</u>	<u>Gloss</u>
(a)	(s)tiqíw	horse
	(ʔəs)q ^w ííúú	dirty
	(s)qabúí	dug-out canoe
	yabíð	fruit
	k ^w upíc	master
	cucíð	mouth
	tabíx ^w	land
	dəcá'h	I, me
<hr/>		
(b)	ʔisáw	chew
	ʔííáí	weep
	ʔabút.	stand
	ʔaxíc	go to bed
	ʔupáí	eat
	(s)ʔubát	name
	(ʔəs)ʔəlíx ^w	hunter
	ʔətə́x ^w	scratch
<hr/>		
(c)	ííʔíí	yonder
	bíʔíð	leave it!

Fig. 79.--Roots CVCVC

	<u>Root</u>	<u>Gloss</u>
(a)	pástəd	Caucasian
	bəqsəd	nose
	báčləd	flea
	bəščədʔ	louse
	x ^w isqám	few
	x ^w əltəb	Caucasian
<hr/>		
(b)	(s)q ^w əl.əp	ashes
	qəl.əb	bad
	q ^w əl.əq	slow
	(s)yəl.əb	year
	šəl.əs	fish
<hr/>		
(c)	(s)q ^w əš.əb	fog
	(s)x ^w íš.əd	deer
<hr/>		
(d)	qəb.əd	axe
<hr/>		
(e)	čál.aš	hand
	čəltas (Eels)	hand

Fig. 80.--Roots CVCCVC

<u>Root</u>	<u>Gloss</u>
(s) tibʔát	man
x ^w úʔbat	paddle
pəlʔád	tree bark
q ^w áɫʔtəd	skin
pəlʔáq ^w	gravel cook
q ^w iʔwác	ashes
čəʔwát	fine, well
čəʔwás	wife
šəʔwái	road
šəʔwal	mole
dəʔwéh	thou
məmʔə's	thin
báyʔac (~ báyac)	meat

Fig. 81.--Roots CVCʔVC or CVʔCVC

<u>Stem</u>	<u>Gloss</u>
(a) tusáýad	oyster
yətáwad	salmon-berry
páwaqəd	crane (bird)
(b) q ^w əládi(h)	ear
yapáci(h)	six
ʔəsáli(h)	two
(c) wədəbax ^w	black-berry
k ^w ábaləx ^w	root
q ^w ádayəx ^w	rat
(d) ʔúpədəčs	ten
(e) dušúyay	wolf
(f) tqáci(h)	eight
(g) tkáyas	basket

Fig. 82.--Stems C(V)CVCVC

píš-pš	cat
káw-kaw	goose
ká-kəh	crow
k ^w ú-k ^w u ^w	salmon back-bone
q ^w í -q ^w ay	necklace
xəb-xəb	Hamma-Hamma River
xət-xət	mallard
xa-xá?	Holy, God
xələw?-xələw?	spider, butterfly
x ^w ay'ə-x ^w ay'ə ^w	fly (insect)
la-láb	oar

Fig. 83. Reduplicating Stems

	<u>Stem</u>	<u>Gloss</u>
(a)	bíx ^w -ax ^w	smile
	dəl-al	stop
	cáy-ay	mix up
	k ^w əd-ad	hold
	k ^w əl-al	spill
	qáx ^w -ax ^w	freeze
	líl-q	slip
	ʔíl-al	sing
<hr/>		
(b)	(s)ʔəl ^w -aq ^w	snow

Fig. 84.--Inchoative Stems

C	q	language
	č (~ čál)	prepare, make
CC	čt	decade, tribelet
	qs	point
CVC	dís	tooth
	šəd	foot
CVCVC	dábac	body
VC	áp	end, bottom
	áy(h)	plant
	fk ^w	clothing
	ús	face
	áyas	round object, eye
	ádi(h)	ear
	áčí(h)	hand
VCVC	áxad	arm
	áíəl	lips
	ícad	back
	íq ^w ad	head
	íwad	inside
	úcad	mouth

Fig. 85.--Lexical Affixes¹ (Selected)

¹Cf. Hess (1967), sec. 352.31.

APPENDIX III

SOURCES CITED

III.1. List of Abbreviations

AA	American Anthropologist
AAOJ	American Antiquarian and Oriental Journal
AnLg	Anthropological Linguistics.
BAE-B	Bulletin of the Bureau of American Ethnology.
CA	Current Anthropology.
HAIL	Handbook of American Indian Languages.
IJAL	International Journal of American Linguistics.
JASA	Journal of the Acoustical Society of America.
Lg	Language.
QPR	Quarterly Progress Report (MIT).
RSC-PT	Proceedings and Transactions of the Royal Society of Canada.
SI-AR	Annual Reports of the Board of Regents of the Smithsonian Institution.
SJA	Southwest Journal of Anthropology.
TCLP	Travaux du Cercle linguistique de Prague.
UCPL	University of California Publications in Linguistics.
UCPAAE	University of California Publications in American Archaeology and Ethnology.
ZFE	Zeitschrift für Ethnologie.

III.2. Sources Cited¹

- Adler, Fred W. "A bibliographical checklist of Chemakuan, Kutenai, Ritwan, Salishan and Wakashan Linguistics," IJAL 27 (1961) 198-210
- Andrade, Manuel J. Quileute, HAIL 3 (1933) 149-292.

¹An attempt has been made to include all sources of material relevant to the description of the Twana language.

- Bergsland, K. and Vogt, H. "On the validity of glottochronology," CA 3 (1962) 115-153.
- Björk, L. "Velopharyngeal function in connected speech," Acta. Radiolog. Supp. 202 (1961).
- Bloomer, H. "Observations on palatopharyngeal movements in speech and deglutition," Journal of Speech and Hearing Disorders (1953), 230-246.
- Bloomfield, L. "Menomini Morphophonemics," TCLP 8 (1939) 105-115.
- Boas, F. "A Chehalis Text," IJAL 3 (1934) 103-110.
- Boas, F. "Kwakiutl," HAIL 1 (1911) 423-558.
- Boas, F. "The Indians of British Columbia," RSC-PT (1888) 48-50.
- Boas, F. and Haeberlin, H. K. "Sound shifts in Salishan dialects," IJAL 4 (1927) 117-136.
- Chafe, Wallace L. "Estimates regarding the present speakers of North American Indian Languages," IJAL 28 (1962) 162-171.
- Chomsky, N. and Halle, M. The Sound Pattern of English. New York (1968).
- Delattre, P. "Durée vocalique et consonnes subséquentes," Maître Phonétique (1939).
- Dyen, I. "The lexicostatistically determined relationship of a language group," IJAL 28 (1962) 153-161.
- Edel, May M. "The Tillamook language," IJAL 10 (1939) 1-57.
- Eels, Rev. M. "The Twana Indians of the Skokomish Reservation in Washington Territory," Bulletin of the Survey (Department of the Interior, U. S. Geological and Geographical Survey) 3.1 (1877) 57-114.
- Eels, Rev. M. "The Twana Language of Washington Territory," AAOJ 3 (1880) 296-303.
- Eels, Rev. M. "The Twana, Chemakum and Klallam Indians of Washington Territory," SI-AR (1887) 605-681.
- Eels, Rev. M. Hymns in the Chinook Jargon Language, Portland (1889).
- Elert, C.Ch. Phonologic Studies of Quantity in Swedish (1964).
- Elmendorf, W. W. "Twana kinship terminology," SJA 2 (1946) 420-432.
- Elmendorf, W. W. "Word taboo and lexical change in Coast Salish," IJAL 17 (1951) 205-8.

- Elmendorf, W. W. "Word lists," duplicated field notes (1954).
- Elmendorf, W. W. The Structure of Twana Culture, Washington State University Research Studies, Monograph Supplement No. 2 (1960).
- Elmendorf, W. W. "System change in Salish kinship terminologies," SJA 17 (1961)(A) 365-382.
- Elmendorf, W. W. "Skokomish and other Coast Tales," Research studies 29 (1961)(B) 1,2.
- Elmendorf, W. W. "Relations of Oregon Salish as evidenced in numeral stems," AnLg 4.2 (1962)(A) 1-16.
- Elmendorf, W. W. "Lexical innovation and persistence in four Salish dialects," IJAL 28 (1962)(B) 85-96 [100-word lists].
- Elmendorf, W. W. "Geographical ordering, sub-grouping, and Olympic Salish," paper for 3rd International Congress on Salish Languages, Seattle (1968).
- Frachtenberg, J. "Abnormal types of speech in Quileute," IJAL 1 (1920) 295-299.
- Fritzel, B. "An electromyographic study of the movements of the soft palate in speech," Folia. phoniatr. 15 (1963) 307-311.
- Fritzel, B. "Levator and Palatoglossus muscles in movements of the Soft Palate," Abstract, Program of 75th Meeting of the Acoustical Society of America (1968).
- Gatschet, Albert S. "Skqomish tribe and language," AA 4 (1902) 197.
- Gibson, J. "Phonology of Quinault," M.A. thesis, University of Washington (1964).
- Gunther, E. Ethnobotany of Western Washington. University of Washington Press (1945).
- Haeblerlin, Herman K. "Types of reduplication in the Salish dialects," IJAL 1 (1917) 154-174.
- Halle, M. The Sound Pattern of Russian. The Hague (1959).
- Halle, M. and Stevens, K. N. "On the mechanism of glottal vibration for vowels and consonants," in QPR 85, M.I.T. (1967).
- Hamp, Eric P. "Another look at Tillamook phonology," paper for 2nd International Conference on Salish Languages, Seattle (1967).
- Hamp, Eric P. "Quileute and Salish Lexical Suffixes," paper for 3rd International Conference on Salish Languages, Seattle (1968).

- Harris, Jimmy G. "Phonology of Chilliwack Halkomelum," M.A. thesis, University of Washington (1966).
- Hess, Thomas M. Grammar of Snohomish. Ph.D. dissertation, University of Washington (1967).
- Hess, Thomas M. "Snohomish Chameleon Morphology," IJAL 32 (1966) 350-356.
- Hockett, C. F. "Peiping morphophonemics," Lg 26 (1950), 63-85.
- Hoijer, H. "Some problems of American Indian linguistic research," UCPL 10 (1954) 3-12.
- Jacobs, M. "Historical perspectives in Indian languages of Oregon and Washington," Pacific Northwest Quarterly 28 (1937) 55-74.
- Jacobs, M. "The areal spread of sound features in the languages north of California," UCPL 10 (1951) 46-56.
- Jakobson, R. G., Fant, G., and Halle, M. Preliminaries to Speech Analysis. (2d ed.) Cambridge, Mass. (1963).
- Jones, D. An Outline of English Phonetics. Cambridge, Mass. (1959).
- Joos, M. "The definition of juncture and terminals," 2nd Texas conference (1957?).
- Kim, Chin W. "The linguistic specification of speech," Working Papers in Linguistics No. 5, UCLA (1966).
- Kim, Chin W. "On the autonomy of the intensity feature in stop classification," Word 21 (1965), 339-359.
- Kim, Chin W. "Cineradiographic study of Korean stops and a note on 'aspiration,'" QPR 86, MIT (1967).
- Kinkade, M. Dale "Phonology and Morphology of Upper Chehalis," IJAL I (1963), 29.181-195; II (1963), 29.345-356; III (1964), 30.32-61; IV (1964), 30.251-260.
- Kinkade, M. Dale "Vowel alternation in Upper Chehalis," IJAL 32 (1966) 343-349.
- Kinkade, M. Dale "Uvular-Pharyngeal Resonants in Interior Salish," IJAL 33 (1967) 228-234.
- Kiparsky, P. "How abstract is phonology?" mimeo (1968).
- Kozhevnikov, V.A., and Chistovich, L.A. Speech--articulation and perception, U. S. Department of Commerce (1965) [Joint Publications Research Service].
- Kroeber, A. L. "Cultural and natural areas of native North America," UCPAAE 38 (1939), 1-242.

- Kreuger, J. R. "A Flathead Supplement to Vogt's Salishan Studies,"
Miscellanea Selica I, AL, 2, 33-38.
- Kuipers, Aert The Suquamish Language, Mouton (1967).
- Ladefoged, P. A Phonetic Study of West African Languages. (2d ed.)
Cambridge (1968).
- Ladefoged, P. The nature of general phonetic theories, Georgetown Monograph
No. 18 (1965).
- Lakoff, G. "On the nature of syntactic irregularity," Report No. NSF 16,
Computation Laboratory of Harvard University (1965).
- Lehiste, I. "An Acoustic-Phonetic Study of Internal Open Juncture,"
Phonetica Supp. 5 (1960).
- Lehiste, I. and Peterson, G. "Duration of syllable nuclei in English," JASA
32 (1960), 693-703.
- Lisker, L., and Abramson, A. S. "A cross-language study of voicing in initial
stops: acoustical measurements," Word 20 (1964), 384-422.
- Malikouti-Drachman, A. "Phonology of Nisqually," unpublished field notes
(1964, 1965).
- McCawley, J. D. "The role of a phonological feature system in a theory of
language," mimeo (1967).
- Mooney, J. The Aboriginal population of America north of Mexico. Smith-
sonian Misc. Colls 8.7 (1928).
- Mooney, J. The ghost Dance Religion. The shakers of Puget Sound. Bureau of
American Ethn, 14th Annual Report (1892-1893).
- Newman, S. "A comparative study of Salish lexical suffixes," paper for 3rd
International Conference on Salish Languages, Seattle, 1968.
- Ohman, S. E. G. "Coarticulation in VCV utterances: spectrographic measure-
ments," JASA 39 (1966).
- Perkell, J. S. "Studies of the dynamics of speech production," QPR No. 76,
M.I.T. (1965).
- Perkell, J. S. "Cineradiographic studies of speech: implications of a de-
tailed analysis of certain articulatory movements," Report to the 5th
International Congress of Acoustics, 1.A32, University of Liege (1965).
- Pilling, James C. Bibliography of the Salishan languages," BAE-B 16 (1893).

- Reichard, G. A. "A comparison of five Salish languages," IJAL 24 (1958) 293-295; 25 (1959) 8-15; 90-96, 154-167, 239-253; 26 (1960) 50-61.
- Reichard, G. A. Coeur d'Alene HAIL 3 (1938).
- Sapir, E. "Central and North American Indian languages," Encyclopedia Brittanica ed. 14 (1929).
- Sapir, E. "Glottalized continuants in Navaho, Nootka and Kwakiutl with a note on Indo-European," Lg 14 (1938) 248-274.
- Snyder, W. A. Southern Puget Sound Salish: phonology and morphonology, Sacramento Anthropol. Soc., Paper 8 (1968).
- Stanley, R. "Phonological redundancy rules" (1965).
- Stanley, R. "Redundancy rules in phonology," Lg 43 (1967).
- Suttles, W. and Elmendorf, W. W. "Linguistic evidence for Salish pre-history," in Symposium on Language and Culture (Proc. Amer. Ethn. Soc. 1962 Seattle) 41-52.
- Swadesh, M. "Salish internal relationships," IJAL 16 (1950) 157-167.
- Swadesh, M. "Salish phonologic geography," Lg 28 (1952) 232-248.
- Swadesh, M. "Mosan I, a problem of Remote Common Origin," IJAL 19 (1953) 26-44.
- Swadesh, M. "Mosan II, Comparative Vocabulary," IJAL 19 (1953) 223-236.
- Thompson, L. C. and M. Terry. "A fresh look at Tillamook phonology," IJAL 32 (1966) 312-319.
- Thompson, Larry C. "First international Conference on Salish Languages," mimeographed notes (1966).
- Thompson, L. C. and M. Terry. "Metathesis as a grammatical process in Clallam," paper 3rd International Congress on Salish Languages, Seattle (1968).
- Trager, G. L. and Smith, H. L., Jr. An outline of English structure, Occasional Papers 3: Studies in Linguistics, Washington (1957).
- Voegelin, C. F. "Influence of area in American Indian Linguistics," Word 1 (1945) 54-58.
- Vogt, H. "Salishan studies: comparative notes on Kalispel, Spokane, Colville and Coeur d'Alene," Skrifter utgitt av det Norske Videnskaps Akademi 2 (1940) 1-19.
- Vogt, H. The Kalispel Language. Oslo (1941).